

**EXPLANATION OF SIGNIFICANT DIFFERENCES  
SULLIVAN'S LEDGE SUPERFUND SITE  
OPERABLE UNIT I**

**I. INTRODUCTION**

This document is a final Explanation of Significant Differences ("ESD") between the remedial action specified in the Record of Decision for the Sullivan's Ledge Superfund Site ("Site"), Operable Unit I (the "OU-I ROD") signed June 29, 1989, and those now planned. This document also describes the conditions that justify these changes to the remedial action.

**A. Site Name, Location**

**Site:** Sullivan's Ledge Superfund Site --  
Operable Unit I ("OU-I")

**Site Location:** New Bedford, Massachusetts

**B. Lead and Support Agencies**

**Lead Agency:** United States Environmental Protection Agency ("EPA")

**Contact:** David O. Lederer  
(617) 918-1325

**Support Agency:** Massachusetts Department of Environmental Protection ("MA  
DEP")

**Contact:** Evelina Vaughan  
(617) 348-4037

**C. Legal Authority**

Pursuant to Section 117(c) of the Comprehensive Emergency Response, Compensation and Liability Act ("CERCLA"), 42 U.S.C. § 9617, Section 300.435(c) of the National Contingency Plan ("NCP"), 40 C.F.R. § 300.435(c), and EPA guidance, if any remedial or enforcement action is taken under Section 106 or 122 of CERCLA after adoption of a final remedial action plan, and if such action differs in any significant respect (i.e., in scope, performance, or cost) from the final plan, EPA must publish an explanation of the significant differences and the reasons why such changes were made. EPA's Interim Final Guidance on Preparing Superfund Decision Documents (OSWER Directive 9355.3-02, June 1989) further provides that issuance of an ESD is appropriate when EPA determines that the need for changes to a remedial action is significant but does not fundamentally alter the overall remedy.

Because EPA has determined that the changes to the remedial action at OU-I described below create significant but not fundamental differences from the remedy prescribed by the OU-I ROD, EPA is issuing this ESD.

**D. Summary of Circumstances Necessitating this ESD**

Monitoring of soil gas concentrations was conducted at the Site by the Sullivan's Ledge Group, a group of 14 private parties that are performing remedial and operation and maintenance activities at the Site. The monitoring results, as summarized in the "Sullivan's Ledge Superfund Site Additional Soil Gas Investigations" report (the "Soil Gas Report"), dated September 30, 2002, indicated the presence of elevated concentrations of methane in gas monitoring wells and soil vapor points. The Soil Gas Report is attached as Appendix A.

Elevated methane gas concentrations present an explosion and/or fire threat and therefore pose a risk to human health. To ensure that public health is protected by minimizing methane emissions, an active gas extraction and collection system will be installed at OU-I by the Sullivan's Ledge Group. Because this system is not, at present, a required component of the remedy as described in the OU-I ROD, EPA is issuing this ESD. In addition, Massachusetts regulations concerning emission levels for methane gas are also being added as applicable requirements of the OU-I ROD.

EPA's Interim Final Guidance on Preparing Superfund Decision Documents (OSWER Directive 9355.3-02) states that an ESD is appropriate when changes to a component of a remedy are incremental changes to the hazardous waste approach selected for a site (i.e., a change in timing, cost, or implementability). EPA has determined that the revision to the remedy described in this ESD does not fundamentally alter the overall approach of the remedy but, rather, is an incremental change to a component of the remedy. In particular, a passive gas collection system currently exists at the Site; the proposed revision is being implemented because Site conditions require that this system be changed from passive to active gas extraction and collection. This change results in a moderate increase in costs, is easily implementable, and is expected to immediately control elevated methane gas concentrations. Taking all these factors together, it is appropriate to make this change to the OU-I ROD through this ESD.

**E. Location and Times at Which the Administrative Record File is Available for Public Review**

In accordance with Section 117(d) of CERCLA, this ESD will become part of the Administrative Record for the Sullivan's Ledge Site, which is available for public review at the times and two locations listed below:

EPA Region 1 Records Center  
One Congress Street  
Boston, MA 02203  
(617) 918-1356

Monday - Friday: 10:00 a.m. - 1:00 p.m.  
2:00 p.m. - 5:00 p.m.

New Bedford Main Library  
613 Pleasant Street  
New Bedford, MA 02740-6203  
(508) 991-6275

Monday - Thursday: 9:00 a.m. - 9:00 p.m.  
Friday & Saturday: 9:00 a.m. - 5:00 p.m.

## **II. SUMMARY OF SITE HISTORY, RESPONSE HISTORY, CONTAMINATION PROBLEMS, AND SELECTED REMEDY**

### **A. Site History**

The Sullivan's Ledge Disposal Area (the "Disposal Area") is a 12-acre parcel located in an urban area of the City of New Bedford in Bristol County in southeastern Massachusetts. The Disposal Area is bounded on the north by Hathaway Road, on the south by the Interstate 195/Route 140 interchange and on the east and west by commercial development. The northeast corner of the Disposal Area and adjacent areas are located in the 100-year floodplain of an unnamed stream (the "Unnamed Stream"). Immediately north of the Disposal Area, across Hathaway Road, is the Whaling City Golf Club (the "WCGC"), approximately 250 acres in size.

The Disposal Area was formerly operated as a granite quarry. Four granite pits with estimated depths of up to 150 feet were identified in field investigations. After quarrying operations ceased, the land was acquired by the City of New Bedford. Between the 1930s and the 1970s, the quarry pits and adjacent areas on the Disposal Area were used for the disposal of hazardous materials and other industrial and solid wastes.

By way of the Unnamed Stream, which leads from the Disposal Area across the WCGC's land to water hazards on the WCGC's premises (the "Water Hazards"), contaminants migrated from the Disposal Area to (i) the Unnamed Stream, (ii) the Water Hazards, and (iii) wetlands on the WCGC's land which straddle the Unnamed Stream (the "Middle Marsh Area") (these areas and adjacent areas of concern are referred to collectively as the "Site").

EPA divided the Site into two operable units. Operable Unit 2 ("OU-II") is the Middle Marsh Area, while OU-I, which is the subject of this ESD, consists of the remaining areas of the Site. Remedial work on the two operable units was conducted by the Sullivan's Ledge Group under separate consent decrees which provided for the coordination of certain remedial activities.

### **B. Contamination Problems**

EPA completed Phase I and Phase II Remedial Investigations at OU-I (the "RIs") in 1987 and 1989, respectively. The RIs revealed high concentrations of polychlorinated biphenyls ("PCBs") and polycyclic aromatic hydrocarbons in surface and subsurface soil. High concentrations of

PCBs were also found in sediments. The RIs also indicated the presence of volatile organic compounds ("VOCs") and inorganics in the groundwater.

The RIs found contamination in (i) Disposal Area soil, (ii) PCB-contaminated sediments that washed off the Disposal Area into the Unnamed Stream, OU-II, the Water Hazards and other adjacent wetland areas, and (iii) wastes disposed of in the former quarry pits. In addition, groundwater in the overburden and bedrock is contaminated from wastes within the quarry pits.

### C. Response History

Early in 1982, the Massachusetts Department of Public Works conducted tests at the Site in response to a proposal for construction of a commuter parking lot. Electrical capacitors were unearthed in the test borings. In 1982, EPA conducted an air monitoring program in the greater New Bedford area. EPA installed groundwater monitoring wells around the Site in 1983. Based in part on the results of these studies, the Site was included on the National Priorities List in September 1984.

In September 1984, EPA issued the owner of the Site, the City of New Bedford, an Administrative Order under Section 106 of CERCLA. In compliance with this Order, the City of New Bedford secured the Disposal Area by installing a perimeter fence and posting signs warning against unauthorized trespassing.

EPA completed the two RIs in September 1987 and January 1989. The Feasibility Study was also completed in January 1989.

On June 29, 1989, EPA issued the OU-I ROD, which included a final remedial action plan. On June 11, 1991, the U.S. District Court of Massachusetts entered a Consent Decree in United States v. Acushnet Co., et al., Civil Action No. 91-10706-K (the "OU-I Consent Decree"). The OU-I Consent Decree serves as the legally binding agreement between EPA, MA DEP and the Sullivan's Ledge Group.

The OU-I ROD also contains EPA's decision to divide the Site into two operable units. A decision on a remedial action at OU-II was deferred until further studies had been performed. After completion of studies and selection of a remedy, EPA issued a ROD for OU-II on September 27, 1991 (the OU-II ROD).

On April 23, 1993, the U.S. District Court of Massachusetts entered a Consent Decree in United States v. AVX Corporation, et al., Civil Action No. 93-10164-K, for the Middle Marsh Operable Unit (the "OU-II Consent Decree"). The OU-II Consent Decree serves as the legally binding agreement between EPA, MA DEP, the Sullivan's Ledge Group, and the City of New Bedford to perform remedial activities at OU-II.

After entry of the Consent Decrees, the Sullivan's Ledge Group conducted several studies to characterize further the extent of contamination at the Site. The Group also designed the remedial technologies that encapsulate contaminants in the soil and sediments and treat

groundwater. Although not called for in the ROD, the Group also incorporated a passive gas collection system into the landfill cap.

The Sullivan's Ledge Group began constructing the OU-I remedy in 1998; the OU-II project began in 1999. These projects were essentially complete by the fall of 2000. EPA approved the Group's final Remedial Construction Reports for OU-I and OU-II on January 23, 2003. At present, the Group is performing operation and maintenance activities at the Site.

#### **D. Summary of the Selected Remedy**

The selected remedy set forth in the OU-I ROD combines components of different source control alternatives and a management of migration alternative to obtain a comprehensive approach for remediation of all portions of OU-I. In summary, the selected remedy consists of nine components:

1. Site preparation;
2. Excavation, solidification and disposal in the Disposal Area of contaminated soils from the Disposal Area (including the floodplain section);
3. Excavation, dewatering, solidification and disposal in the Disposal Area of contaminated sediments from the Unnamed Stream and the Water Hazards;
4. Construction of an impermeable cap with a passive gas collection system over the Disposal Area, except for the floodplain section (a passive gas collection system was incorporated into the cap during pre-design activities);
5. Diversion and lining of a portion of the Unnamed Stream;
6. Collection and treatment of contaminated groundwater;
7. Wetlands restoration/enhancement;
8. Long-term environmental monitoring; and
9. Institutional controls, including restrictions on groundwater use.

In addition, the selected remedial action for OU-II consists of the following components:

1. Site preparation;
2. Excavation of contaminated sediments and soils from portions of the Middle Marsh and adjacent wetlands;
3. Dewatering of the excavated materials;

4. Disposal of the materials beneath the cap that was constructed over portions of the Disposal Area;
5. Restoration of the affected wetlands; and
6. Long-term environmental monitoring.

On July 26, 1995, EPA issued an ESD documenting changes to the remedial action specified in the OU-I ROD. The ROD called for excavation of soils within the Disposal Area down to the seasonal low water table, dewatering, solidification, and placement back within the Disposal Area under an impermeable cap. The revised remedy outlined in the ESD called for soils in the Disposal Area to remain in place, untreated, and covered by the cap. The ROD also called for soils and sediments from the Unnamed Stream, water hazards, and other areas of OU-I outside the Disposal Area that exceed cleanup standards to be excavated, treated, and disposed of under the the Disposal Area cap. Under the revised remedy, excavated soils and sediments from these areas would remain untreated and would be disposed of under the Disposal Area cap.

Another ESD was issued by EPA on September 27, 2000, documenting additional changes to the remedial action specified in the OU-I ROD. The ROD called for the concrete lining of about 750 feet of the Unnamed Stream in the portion parallel to the eastern boundary of the Site. Under the revised remedy, the stream channel was permanently placed in an underground 72-inch pre-stressed concrete cylinder pipe and a new stream channel was created on the golf course and vegetation planted to recreate the habitat lost. The ROD also called for passive groundwater collection along the eastern and southern boundary of the Site consisting of an under drain pipe within a shallow trench. The revised remedy called for a slurry wall along a portion of the southern boundary and two recovery wells adjacent to the slurry wall.

### **III. DESCRIPTION OF SIGNIFICANT DIFFERENCES AND THE BASIS FOR THESE DIFFERENCES**

#### **A. Summary of Information Demonstrating Significant Differences from the Selected Remedy**

##### Addition of a Methane Extraction and Collection System

CERCLA requires that five-year reviews be conducted at sites whenever waste is left in place as a result of remedial action. As part of the first five-year review of OU-I, data collected at the Site revealed methane emissions at the property boundary at levels that posed a risk to human health due to the threat of explosion and/or fire (EPA is not aware of any evidence which indicated that these emission levels posed a risk to human health due to inhalation).

In accordance with a Sullivan's Ledge Group's letter to EPA dated April 12, 2002, discussions with EPA and MA DEP at a May 16, 2002 meeting, and subsequent conference calls on June 24 and 26, 2002, the Sullivan's Ledge Group conducted a Comprehensive Site Assessment at the Site from July 8 through July 11, and July 25, 2002. The assessment, which was conducted in accordance with 310 C.M.R. § 19.150(5), included the installation of 15 soil vapor points and 10

soil borings (including one 5-foot bedrock core and soil samples for grain size analysis), the sampling of landfill gas monitoring wells and the screening of adjacent buildings and structures for landfill gas. Seven vapor samples were collected for VOC analysis and 15 landfill gas vents were monitored for landfill gas and VOCs.

Based upon data collected in the Comprehensive Site Assessment, the September 30, 2002 Soil Gas Report made the following conclusions:

1. Gas is migrating from the Disposal Area, primarily to the east and west. Soil vapor and landfill gas analysis for VOCs supports the conclusion that the methane and hydrogen sulfide detected east and west of the Site has the Disposal Area as its source.
2. Monitoring data from the passive gas vents shows that the vents may not be effectively venting methane and other gases from the Disposal Area. In July 2002, seven of the 15 gas vents exhibited more than 25% of Lower Explosive Limits ("LELs") for methane.
3. South of the landfill, and north of Hathaway Road, methane monitoring from gas vents and soil vapor probes showed results at either non-detect or less than 25% of LELs.
4. Multiple rounds of monitoring adjacent buildings and structures have consistently shown non-detect levels of methane.
5. Methane concentrations at the gas vents may be explained, in part, by the presence of the OU-II sediments. It is likely that the organic materials in those sediments have been degrading, creating methane in the immediate vicinity of the vents observed in monitoring performed after completion of the Disposal Area cap in 2001. As the material degrades, it is expected that methane concentrations will decrease over time.
6. Because it appears that gas is not being effectively released through the current gas venting system, migration is occurring through other pathways. The data suggests that the most likely migration pathway is through fractures in the bedrock, which exists at around 0 - 15 feet below ground surface (except where quarried much deeper in the past). The following observations support this conclusion.
  - On the east side of the landfill near Rosie's Restaurant, an abutting business, both the groundwater collection trench and the 72-inch stream diversion pipe (which is installed down to bedrock and backfilled with low permeability soil) both create an effective barrier to gas migration through the overburden. The presence of methane east of the Site suggests that gas is migrating through bedrock fractures and is being released into overlying soils.
  - On the west side of the Disposal Area at the Day's Inn Motel, another abutting business, methane was detected in the perimeter gas monitoring wells and in soil vapor points installed adjacent to the motel, but not in a row of soil vapor points (SV-2 through SV-8) between the Disposal Area and this business. Data collected from soil borings show that the overburden soils contain a fairly high percentage of fine-grained materials

(greater than 25% passing No. 200 sieve), which would lower the permeability of the fine, sandy soils. As a result, methane migrating through bedrock would be less likely to escape through the overburden soils, but would instead be released through the granular materials adjacent to the hotel foundation.

- The presence of elevated methane to the east and west of the landfill, but not to the north and south, supports the theory that gas is migrating through bedrock fractures. Such fractures would tend to be aligned in one general direction, in this case east-west. This theory is supported by information concerning orientation of fractures presented in the RIs.

Figure 3 of the Soil Gas Report presents a cross-section through the Disposal Area. As previously mentioned, the Sullivan's Ledge Disposal Area was created largely by the disposal of industrial wastes into rock quarry pits. As a result, most of the mass of landfilled material is located below the top of bedrock. Because methane is migrating away from the Disposal Area through the bedrock zone, an appropriate control measure is venting of the landfill gas at the Disposal Area.

The Sullivan's Ledge Group performed a Corrective Action Alternative Analysis concerning methods of mitigating the migration of explosive gas concentrations that exceed state regulatory levels specified in 310 C.M.R. § 19.132(4)(g) and (h). The Analysis concluded that active gas control with data collection to evaluate the effectiveness in removing landfill gas and reducing off-site migration of landfill gases above 25% of the LELs was the preferred method of mitigating gas migration. On November 15, 2002, a Corrective Action Design was submitted to EPA for approval on behalf of the Sullivan's Ledge Group by O'Brien and Gere ("OBG"), the Group's engineering consultant.

The Group proposed that a pilot gas extraction system, consisting of a trailer-mounted 8 horsepower blower with knockout tank and gauges to record stack discharge velocity and temperature, be installed. After approval by EPA, the pilot gas extraction system was connected to gas vents GV-1 and GV-8. GV-1 induces a vacuum from the northeast corner of the landfill, while GV-8 (connected by a below grade header to gas vents GV-12, GV-13, and GV-14) induces a vacuum from the west side. Gas vents GV-12, GV-13 and GV-14 were capped to prevent short-circuiting.

On December 19, 2002, a baseline set of gas monitoring readings was taken from the landfill gas monitoring wells. The wells were screened for landfill gas constituents and VOCs.

After startup and shakedown operations, on January 6, 2003, the gas extraction system was restarted. After three consecutive days of readings, adjustments were made and the pilot system was then operated continuously for a three month period. Results indicated that the system lowered methane concentrations to acceptable levels at perimeter landfill gas monitoring wells.

In August 2003, OBG, on behalf of the Sullivan's Ledge Group, submitted drawings for a full scale active landfill gas collection system (attached as Appendix B) to EPA. The design is based

on the results of the successful pilot system explained above and includes the collection of gas from the east, west, and north sides of the landfill by using a blower.

## **B. Description of Significant Differences Between the Remedy as Presented in the ROD and the Action Now Proposed**

### **1. Description of Differences**

There was no provision in the ROD for the collection of gas migrating from the Disposal Area of the Site. Figure 7 (Proposed Cap Design) of the ROD did not include a sand layer to collect methane emissions from the Disposal Area cap. However, during pre-design activities, a passive collection system was incorporated into the cap design. Because this system proved to be inadequate to control gas buildup under the cap, as recommended by the Soil Gas Report and the subsequent Corrective Action Analysis, the Sullivan's Ledge Group will install a permanent onsite soil gas extraction and collection system.

### **2. Rationale for Changes**

EPA Interim Final Guidance on Preparing Superfund Decision Documents (OSWER Directive 9355.3) states that changes to a component of a remedy (i.e., a change in timing, cost, or implementability) generally are incremental changes to the hazardous waste approach selected for a site. The revisions to the remedy described in this ESD do not fundamentally alter the overall approach of the remedy and are consistent with the above-referenced guidance.

The cost of the gas extraction and collection system is low in comparison to that of the overall project, easily implemented, and necessary in the near term to control the buildup of potentially explosive levels of methane under the Disposal Area cap.

The landfill gas extraction and collection system is necessary to ensure that the remedy is protective of human health, welfare and the environment and meets Applicable or Relevant and Appropriate Requirements ("ARARs"). These changes also are consistent with the overall remedial approach in the OU-I ROD.

### **3. The Revised Remedy Continues to Comply with ARARs for OU-I**

There are four Massachusetts ARARs that are applicable to changed circumstances at the Site. In particular, sections 19.117, 19.118, 19.132 and 19.150 of the Solid Waste Facility Regulations found in Volume 19 of the Code of Massachusetts Regulations are considered applicable requirements concerning the monitoring and detection of methane gas with concentrations greater than 25% of the LELs at monitoring wells. These regulations require the detection and monitoring of landfill gases, the use of corrective action when gases exceed 25% of the LELs to address public health and safety concerns, and the notification of government parties within specified time frames when such concentrations are detected. As the remedy now addresses gas emissions, this ESD incorporates these regulations into the OU-I ROD.

#### IV. SUPPORTING AGENCY COMMENTS

The Commonwealth of Massachusetts has expressed its concurrence with the changes outlined in this ESD in its letter to EPA of September 23, 2003, which is attached to this document as Appendix C.

#### V. STATUTORY DETERMINATIONS

Considering the new information that has been developed and the changes described in this ESD that have been made to the selected remedy, EPA and MA DEP have determined that the remedy remains protective of human health, welfare, and the environment and is cost effective. The revised remedy complies with federal and state ARARS to the same extent as the ROD for OU-I. The basis for continuing to waive portions of ARARs in the OU-I ROD still remains valid.

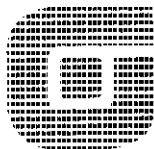
#### VI. PUBLIC PARTICIPATION

Notice and information regarding these changes to the OU-I ROD have been published in the local newspaper, the New Bedford Standard Times.

9/29/03  
Date of Issuance

By: Susan Studler  
Susan Studler, Acting Director  
Office of Site Remediation and Restoration

## APPENDIX A



**O'BRIEN & GERE**  
ENGINEERS, INC.

Superfund Records Center

SITE: \_\_\_\_\_

BREAK: \_\_\_\_\_

OTHER: \_\_\_\_\_

September 30, 2002

Mr. David O. Lederer  
Remedial Project Manager  
Environmental Protection Agency (HBO)  
1 Congress Street, Suite 1100  
Boston, MA 02114-2023

Re: Sullivan's Ledge Superfund Site  
Additional Soil Gas Investigations

File: 5509 / 28602 #5

Dear Mr. Lederer:

On behalf of the Sullivan's Ledge Site Group, O'Brien & Gere Engineers, Inc. is submitting this report on the Additional Soil Gas Investigations conducted at the Sullivan's Ledge Superfund Site in New Bedford, Massachusetts (Site).

#### A. Background

On April 4, 2001, samples were obtained from the perimeter gas monitoring wells at the Site. The sample results, summarized in a letter dated April 11, 2001, showed that 13 perimeter gas monitoring wells (of 21 sampled) had post-purge methane concentrations that exceeded 25% of the lower explosive limit (LEL) for methane. USEPA and MADEP were provided a copy of that letter report. Similar results were observed in six wells that were screened on June 26, 2001. The results of that screening were presented in greater detail in a letter dated July 9, 2001.

Based on discussions with USEPA and MADEP, explosive gas screenings were conducted in subsurface structures and buildings on and adjacent to the Site. The results of the screenings (presented in detail in letters dated May 17, May 31, and July 9, 2001) showed no levels of methane in the buildings and structures. Methane and other gases were measured in the landfill gas vents themselves on April 17, 2001. The results (presented in detail in a letter dated May 17, 2001) showed the presence of methane in the existing passive vents.

In accordance with a letter work plan dated July 16, 2001 an Initial Site Assessment was implemented as required by 310 CMR 19.150(4). The Initial Off-Site Soil Gas Survey was performed at the Site on March 12 through March 14, 2002. A total of 33 soil vapor points were installed. The results of the monitoring, summarized in a letter to the agencies dated April 12, 2002, showed that four soil vapor points west of the landfill had methane at 76 to 614 % LEL. These points were bounded to the north and south by monitoring points where no methane was detected. It was also noted that methane was not detected in four soil vapor points located between the landfill and these monitoring points. Three soil vapor points located east of the landfill showed methane at 463 to 734 % LEL. On March 12, 13, and 14, 2002, screening for



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methane, and other gases, was performed in rooms and common areas at the Day's Inn hotel, at the ground water treatment plant, and in nearby subsurface vaults and catch basins. Methane was not detected at any of the locations screened.

In accordance with a letter dated April 12, 2002, and discussions with USEPA and MADEP at a May 16, 2002 meeting and subsequent conference calls on June 24 and 26, 2002, a Comprehensive Site Assessment was conducted at the Site July 8 through July 11, and July 25, 2002 in accordance with 310CMR 19.150(5). The program included installing 15 soil vapor points and 10 soil borings (including obtaining one 5 - foot bedrock core and soil samples for grain size analysis), sampling the landfill gas monitoring wells, and screening adjacent buildings and structures for landfill gas. Additionally, seven vapor samples were collected for volatile organic compound (VOC) analysis, and 15 landfill gas vents were monitored for landfill gas and VOCs. A summary of the field activities, the results of the activities, an evaluation of the data, conclusions, and the Corrective Action Alternatives Analysis are provided below.

## B. Summary of Field Activities and Results

### 1. Soil Vapor Points

#### Field Activities

On July 8, 2002, 15 soil vapor points (SV-16 through SV-18, and SV-34 through SV-45) were installed at the approximate locations shown on Figure 1. It was necessary to relocate certain soil vapor points slightly (from the locations presented in the April 12, 2002 letter work plan) due to their proximity to underground utilities. A truck-mounted Geoprobe unit installed ten points, while five points (SV-16 through SV-18, SV-44, and SV-45) were advanced by hand using a KVA system. The soil vapor points were completed to three to six feet below grade (bg). Final depths of soil vapor points are summarized in Table 1.

Three points proposed in the April 12, 2002 work plan (SV-16 through SV-18) for advancement on the adjacent property near Rosie's Restaurant were not completed at their proposed locations, as the property owner would not provide consent for access to the Sullivan's Ledge Site Group. Alternatively, these points were installed by hand using a KVA system on the Site's eastern property boundary next to Rosie's. Due to elevated readings detected during the field program, SV-44 and SV-45 were installed as additions to the original work plan to further delineate landfill gas east and west of the landfill.

Soil vapor measurements were collected at sampling locations using a Landtec Model GEM 500 Gas Extraction Monitor (GEM 500) equipped with a hydrogen sulfide monitoring pod to monitor for methane, % LEL, carbon dioxide, oxygen, and hydrogen sulfide. The instrument was calibrated at the start of daily monitoring according to the manufacturer's instructions using zero gas, 15% methane, 4% oxygen, 50% LEL, 50 ppm CO, and 25 ppm H<sub>2</sub>S gases. In addition, VOC measurements were taken using a Thermo Environmental 580B Photoionization Detector (PID). This instrument was calibrated at the start of daily monitoring according to the manufacturer's instructions using zero gas and 100 ppm isobutylene. All instruments were checked at the end of daily monitoring using the same calibration gases described above. A listing of the measurement ranges for the landfill gas monitoring equipment is included as Table 2.

Vapor samples from four temporary soil gas points exhibiting the highest post-purge methane readings (SV-16, SV-42, SV-36 and SV-35) were collected in Summa canisters and submitted to Air Toxics Ltd. for VOC analysis by Method TO-14. Samples were collected from the soil vapor points for the purposes of comparing the results to those for the air samples obtained from the perimeter gas monitoring wells to evaluate whether the off-site gas is consistent with the gas from the landfill.

### Results

The soil vapor measurements are presented in Table 1, and field sampling logs are provided in Attachment B. During the soil vapor monitoring program, % LEL readings greater than 25% were observed at 10 locations: SV-16 and SV-17 on the eastern boundary of the Site, SV-34 through SV-37 at the Day's Inn property, and SV-39, SV-40 and SV-42 at the Cinema property. SV-44 (located east of SV-42 on the Cinema property) and SV-45 (located west of SV-34 on the Day's Inn property) showed no detectable levels of methane. Hydrogen sulfide was detected in 14 of the 21 soil vapor points at concentrations of 1 to 14 parts per million (ppm).

Analytical results for the vapor samples obtained from SV-16, SV-42, SV-36 and SV-35 are provided in Table 3 and shown on Figure 2. Chain of custody documentation is included in Attachment B. The data shows that various VOCs were detected in the off-site soil vapor samples, including vinyl chloride, methylene chloride, 1,1-dichloroethane, chloroform, toluene, tetrachloroethene, ethylbenzene, xylenes, 1,2,4-trimethylbenzene, acetone, cyclohexane, and heptane.

## 2. Soil Borings

### Field Activities

Ten soil borings (SB-1 through SB-10) were installed at the Day's Inn property July 8 through July 11, 2002 to delineate soil lithology and depth to the bedrock surface. The locations of the soil borings are shown on Figure 1. Technical Drilling Services, Inc. (TDS) of Sterling, MA advanced soil borings using a hollow-stem auger drill rig. An air compression hammer was used to confirm the surface of competent bedrock. Split-spoon soil samples were collected continuously to the top of the bedrock surface for the purposes of logging soil lithology, and soil headspace screening for VOCs was conducted using a Thermo Environmental PID with a 10.2 eV lamp. Soil headspace was screened using the MADEP jar headspace method.

### Results

Two predominant soil types were observed in the borings. The soils from borings located closer to the fence line between the Site and the Day's Inn were classified in the field as mainly very fine sand and silt, whereas soils from borings located further west towards the Day's Inn building were logged mainly as fine to medium sand, with little gravel. Soil boring logs are included in Attachment A. Soil samples were collected and composited from SB-2, SB-6, and SB-9 (designated as "Comp2"), and also from SB-1, SB-5, and SB-7 (designated as "Comp1"), for quantitative grain size analysis. The results of the grain size analysis, presented in Table 4, show that the soils in each of the samples comprise primarily very fine sand, with a fairly high percentage (> 25%) of fine-grained silt material.

Based on the borings and a bedrock outcrop located at the northeast corner of the Day's Inn property, depth to bedrock directly to the west of the Site ranges from 0-16 feet bg. A five-foot section of bedrock core was taken from SB-2 using an NX diamond bit bedrock core. The core indicates that bedrock in this area is an orthoclase bearing granite. Approximately 48 inches of rock core was recovered, and the rock quality designation (RQD) was 73.

### 3 Gas Monitoring Wells

#### Field Activities

On July 10, 2002, landfill gas was monitored at 22 on-site gas monitoring wells using a GEM 500, an approach similar to that employed during prior on-site gas monitoring efforts. Additionally, VOC measurements were obtained using the Thermo Environmental 580B PID.

Landfill gas wells are fitted with dedicated PVC sampling caps with valved nozzles, to allow for the use of sampling tubing, and to minimize the potential for ambient air to be drawn into sampling instrumentation. To collect measurements, the GEM 500 was connected to the dedicated nozzles on the perimeter wells and initial measurements for methane, carbon dioxide, oxygen, and hydrogen sulfide were recorded. The PID was then connected to the nozzles and an initial measurement of VOCs taken. The wells were then purged for approximately 4 minutes using a peristaltic pump with a pumping rate of 4 liters/minute and post-purge measurements were recorded.

Three landfill gas samples (GM-2R, GM-5, and GM-20) were collected in Summa canisters and submitted for VOC analysis.

#### Results

On-site gas monitoring well data is presented in Table 5 and shown on Figure 2, and field sampling data sheets are provided in Attachment B. Methane was detected in 18 of the 23 gas monitoring wells sampled at levels ranging from 4% to >1,000 % LEL. The highest % LEL levels were detected in gas monitoring wells GM 1R, 2R, 4R, and 5 located on the west side of the landfill. The west side of the landfill is topographically higher than the east side and methane, being lighter than air, would be expected to migrate in that direction. Hydrogen sulfide was detected in eight samples at concentrations of 4 to 34 ppm. The highest concentration was detected at GM-11 located along the northern boundary of the landfill.

The analytical results of the gas samples obtained from GM-2R, GM-5, and GM-20 are presented in Table 3. Chain of custody documentation is included in Attachment B. Several VOCs were detected in the gas monitoring wells, including chloromethane, chloroethane, xylene, 1,2,4-trimethylbenzene, carbon disulfide, hexane, cyclohexane, and heptane.

### 4 Gas Vent Monitoring

#### Field Activities

On July 25, 2002, landfill gases were monitored at the 15 on-site landfill gas vents using the GEM 500 and the PID. Prior to measurement, instruments were calibrated in the same manner discussed above and

were checked at the end of daily measurements.

Gas vent measurements were collected by placement of sample tubing from the GEM 500 and the PID approximately four feet into the outlet of the gas vent well. Placement of the tubing further into the gas vent was restricted on all gas vents with the exception of GV-4. In this case the tubing advanced to 15 feet.

#### Results

On-site gas vent monitoring data is presented in Table 6 and shown on Figure 2; field sampling data sheets are provided in Attachment B. Methane was detected in ten of the fifteen post-purge samples at levels of 4% to 192% LEL. Hydrogen sulfide was detected at one location (GV-6) at 2 ppm.

### 5. Landfill Gas Screening at Adjacent Buildings and Structures

#### Field Activities

On July 10, 2002, screening for methane and other gases was performed at the Day's Inn, the groundwater treatment plant, and catch basin structures located off-site. The Cinema property was vacant at the time of the program and could not be assessed for landfill gas screening. Access was granted to defined locations within Rosie's Restaurant on July 11, 2002.

Gas screening was conducted using an Industrial Scientific TMX-412 gas monitoring instrument, the GEM 500, and the Thermo Environmental 580 PID. Prior to sampling, the TMX-412 was calibrated according to the manufacturer's instructions with zero gas and a 50% LEL, 50 ppm carbon monoxide and 25 ppm hydrogen sulfide calibration gas. Calibration of the GEM 500 and the Thermo 580B PID was done in the same manner discussed above. The calibration was checked at the end of daily monitoring using the same gases listed above.

#### Results

Methane was not detected at any of the buildings and structures screened. Table 7 summarizes adjacent buildings and structures data.

### C. Evaluation of Data

#### 1. Off-site gas

Landfill gas monitoring conducted west of the landfill (on the Day's Inn side) shows the presence of methane gas in a confined area at points SV-34 through SV-37. These monitoring points are east of previous soil vapor points SV-29 – SV-32, which also showed the presence of methane gas. Previous investigations showed that these detections were bounded to the north, south, and east (toward the landfill) by monitoring points that did not exhibit methane.

To the east of the landfill, adjacent to Rosie's Restaurant, methane was detected at 868% LEL and 356% LEL at SV-16 and SV-17, respectively. Methane was not detected at SV-18. East of the landfill (on the

Cinema side) methane was detected at levels greater than 25% LEL at SV-38, SV-39, SV-40, and SV-42. SV-44, located east of these points, showed no detectable methane. Previous investigations north of these points showed that methane was not detected.

Both the vapor samples obtained from the off-site soil vapor points and those from the gas monitoring wells located adjacent to the landfill showed detectable concentrations of several VOCs, although no clear patterns are discernable. The presence of BTEX compounds in samples from SV-35 and SV-36, in the Day's Inn parking lot, is most likely related to automobile traffic.

## 2. On-site gas

Methane was detected in 18 of the 23 gas monitoring well post-purge samples at levels ranging from 4% to >1,000 % LEL. The highest % LEL levels were detected in gas monitoring wells GM-1R, 2R, 4R, and 5, located on the west side of the landfill. Hydrogen sulfide was detected in eight post-purge samples from the gas monitoring wells at concentrations of 4 to 34 ppm.

Methane was detected in ten of the fifteen post-purge samples obtained from the landfill vents at levels of 4% to 192% LEL. Hydrogen sulfide was detected at one vent at 2 ppm. The data shows that the levels of methane detected in the vents are significantly lower than those detected in the gas monitoring wells. However, it is important to note that the gas vent data cannot be directly compared to gas monitoring well data since the gas monitoring wells are specifically constructed for the purposes of obtaining accurate landfill gas samples. The caps on the wells create a tight seal between the monitoring point and the instrument, allowing them to be purged of "ambient air" before sampling. The gas vents are not constructed for sampling purposes, and were monitored by placing tubing into the vent as far as possible, and purging as necessary to evacuate the ambient air in the tubing. Therefore, the gas vent data should be used for qualitative purposes such as evaluating whether there is significant methane discharge.

As shown on Figure 2, methane levels detected in many of the gas vents in July 2002 are significantly lower than those recorded in April 2001. In July 2002, eight of the 15 gas vents exhibited less than 25 % LEL for methane (five were non-detect), compared to only one out of 14 vents monitored in April 2001.

## D. Conclusions

The following conclusions were drawn from the landfill gas investigations performed at the Site to date:

1. Gas is migrating from the landfill, primarily to the east and west. Soil vapor and landfill gas analysis for VOCs supports the conclusion that the methane and hydrogen sulfide detected east and west of the site has the landfill as its source.
2. South of the landfill, and north of Hathaway Road, all methane monitoring from gas vents and soil vapor probes showed results either non-detect, or less than 25% of the LEL.
3. Multiple rounds of monitoring adjacent buildings and structures have consistently shown non-detect levels of methane.
4. Monitoring data from the passive gas vents shows that they may not be effectively venting methane.

and other gases from the landfill. In July 2002, eight of the fifteen gas vents exhibited less than 25 % LEL for methane (five were non-detect).

5. The difference in methane concentrations at the gas vents between April 2001 and July 2002 may be explained, in part, by the presence of the OU-2 sediments. It is possible that the organic materials in those sediments have been degrading, creating methane in the immediate vicinity of the vents that was observed in the 2001 monitoring. As that fairly recently placed material has degraded, it would be expected that the methane concentrations would decrease over time.
6. Because it appears that gas is not being effectively released through the gas venting system, migration is occurring through other pathways. The data suggests that the most likely migration pathway is through fractures in the bedrock, which exists at around 0 – 15 ft bg (except where quarried much deeper in the past). Observations that support this conclusion include:
  - a. On the east (Rosie's) side of the landfill, the ground water collection trench and the 72-inch stream diversion pipe (which is installed down to bedrock and backfilled with low permeability soil) both create an effective barrier to gas migration through the overburden. The presence of methane east of the site suggests that the gas is migrating through bedrock fractures, and being released into overlying soils at certain locations.
  - b. On the west (Day's Inn) side of the landfill, methane was detected in the perimeter gas monitoring wells and in soil vapor points installed adjacent to the Days Inn, but not in a row of soil vapor points (SV-2 through SV-8) between the landfill and the Days Inn. Data collected from the recent soil borings shows that the overburden soils contain a fairly high percentage of fine-grained materials (greater than 25% passing No. 200 sieve), which would lower the permeability of the fine, sandy soils. As a result, methane migrating through bedrock would be less likely to escape through these soils, but would instead be released through the granular materials adjacent to the hotel foundation.
  - c. The presence of elevated methane to the east and west of the landfill, but not to the north and south, supports the theory that gas is migrating through bedrock fractures. Such fractures would tend to be aligned in one general direction, in this case east-west. This is supported by information regarding orientation of fractures presented in the Remedial Investigation report.
  - d. Most of the gas monitoring wells were installed to the top of bedrock surface, and in some cases slightly into the bedrock. If the gas is migrating through bedrock, it could then be detected in the perimeter monitoring wells.

Figure 3 presents a cross-section through the landfill. As shown, the Sullivan's Ledge landfill was created largely by filling in the old rock quarry, and consequently most of the mass of landfilled material is located below the top of bedrock. If methane is migrating through the bedrock zone, as it appears, then an appropriate control measure would be venting of the landfill gas at its source.

#### E. Corrective Action Alternatives Analysis

In accordance with 310 CMR 19.150(6), this Corrective Action Alternatives Analysis analyzes options for corrective actions to mitigate the migration of explosive gases from the landfill which exceed the concentrations specified in 310 CMR 19.132(4)(g) and (h). The three components of the Corrective Action Alternatives Analysis are presented below.

##### *1. Corrective Action Objective*

In accordance with 310 CMR 19.150(6)(b)1., the objective of the selected alternative is to enhance venting of the landfill gas on-site to mitigate the migration of methane gases off-site above the 25% LEL criteria.

##### *2. Alternatives Analysis*

In accordance with 310 CMR 19.150(6)(b)2., the Alternatives Analysis analyzes two options for site corrective action: 1) no action; and 2) interim active gas extraction system/pilot test on five existing landfill vents. Each alternative is analyzed for its effectiveness in achieving the corrective action objective, its overall cost, and implementability.

##### Alternative 1. No Action

This alternative is included as required by 310 CMR 19.150(6)(b)2. This alternative would not be effective in achieving the corrective action objective. There is no cost associated with this alternative, and it is easily implementable.

##### Alternative 2. Interim Active Gas Control

This alternative consists of operating an interim active gas collection system to attempt to remove landfill gases by creating a vacuum to induce flow toward gas vents, and to function as a pilot test to obtain data necessary for assessment and design of a permanent remedy. It is proposed that one blower will be utilized to extract air from two existing landfill gas vents (initially, from GV-8 and GV-1). GV-8 is connected to GV-12, GV-13, and GV-14 (located on the western side of the landfill) via a previously installed underground gas collection pipe. GV-1 is located on the northeastern side of the landfill, closest to Rosie's Restaurant. During operation of the interim active system, gas vents GV-12, GV-13, and GV-14 will be blocked. It may be necessary to block off other existing nearby vents to prevent short-circuiting. The proposed system would include a condensate collection pot, and the collected condensate will either be treated by the on-site ground water treatment system, or properly disposed off-site.

Compared to "no action", the interim extraction alternative would include costs for design, equipment procurement, installation, and ongoing operation and monitoring. This alternative is moderately implementable, and its effectiveness will be determined once operation commences. During operation of the interim system, periodic measurements of landfill gas concentrations will be made at the blower discharge, and at select monitoring wells. Also, vacuum measurements will be made at existing gas monitoring wells and gas vents to assess the system's performance.

Mr. David O. Lederer  
September 30, 2002  
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### 3. *Recommended Option*

In accordance with 310 CMR 19.150(6)(b)3., the recommended option is active gas control. Due to the complexity of the Site, this option will be implemented as an interim action. Concurrent with operation of the interim gas control system, data collection will be performed to evaluate its effectiveness in removing landfill gas and reducing off-site migration of landfill gas.

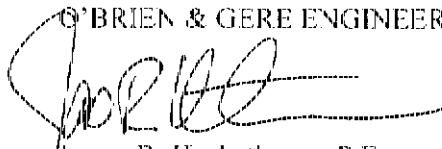
Additionally, up to four gas detectors and alarms will be installed in buildings located in close proximity to the landfill, subject to obtaining the necessary access agreements from the owners. It is anticipated that two detectors will be installed at the Days Inn, and one detector will be installed at both the treatment plant and Rosie's Restaurant. A separate correspondence identifying the exact number and location of detectors, detector specifications, and alarm locations will be provided to the agencies. The installation of the detectors will be performed separately from the Corrective Action Implementation discussed below.

Upon agency approval of the recommended option, the Corrective Action will be implemented in accordance with 310 CMR 19.151(2). The Corrective Action will be conducted in two phases: (a) Corrective Action Design and (b) Corrective Action Implementation. As part of the Corrective Action Design, further engineering analysis will be undertaken to design the interim active gas control system. It is anticipated that a skid mounted package blower unit will be utilized and therefore the design will consist of a description and verification of the proper sizing of the equipment. Additional components such as the interim piping, electrical hookup, operator responsibilities, monitoring, data collection and review, and condensate management will also be described. An implementation schedule will also be included in the submittal for agency approval. Corrective Action Implementation will include installation of components, monitoring, and required operation and maintenance activities.

Please feel free to call Steve Wood or me if you should have any questions.

Very truly yours,

O'BRIEN & GERE ENGINEERS, INC.



James R. Heckathorne, P.E.  
Vice President

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cc: S. Wood - PMC  
E. Bertaut - PMC  
E. Vaughan - MADEP  
D. Dwight -- Metcalf & Eddy  
J. Shanahan -- OBG

Table 1  
Sullivan's Ledge Superfund Site  
Temporary Soil Vapor Point Monitoring  
July 2002

Soil Vapor Location	Date	Time Sampled	Depth (feet)	Methane (%)		Methane % LEL		Carbon Dioxide (%)		Oxygen (%)		Hydrogen Sulfide (ppm)		VOCs (ppm)	
				pre-purge	post-purge	pre-purge	post-purge	pre-purge	post-purge	pre-purge	post-purge	pre-purge	post-purge	pre-purge	post-purge
SV-16 <sup>1</sup>	7/8/02	13:50	4.5	12.9	43.4	280.0	868.0	1.5	6.8	6.7	6.8	2.0	1.0	ND	0.2
SV-17	7/8/02	14:01	5	42.7	42.8	854.0	856.0	6.0	7.0	6.6	6.2	ND	1.0	1.8	2.3
SV-18	7/8/02	16:10	3	ND	ND	ND	ND	0.4	ND	18.9	20.2	11.0	1.0	1.0	1.0
SV-34	7/8/02	12:08	6	5.8	5.9	114.0	116.0	15.1	10.0	1.0	1.4	ND	6.0	1.8	1.0
SV-35 <sup>1</sup>	7/8/02	12:17	6	8.8	9.7	198.0	106.0	11.4	11.3	ND	ND	ND	ND	0.6	0.6
SV-36 <sup>1</sup>	7/8/02	12:25	6	20.0	28.2	514.0	544.0	23.1	22.3	0.1	0.1	1.0	3.0	0.7	0.2
SV-37	7/8/02	12:34	6	15.9	2.0	199.0	38.0	19.8	18.6	ND	ND	2.0	4.0	2.7	2.3
SV-38	7/8/02	14:59	3	0.5	25.4	16.0	508.0	1.5	12.3	10.4	7.0	ND	ND	0.2	0.2
SV-39	7/8/02	14:37	3	27.0	4.0	536.0	80.0	15.1	2.6	0.7	15.0	ND	1.0	1.0	1.0
SV-40	7/8/02	14:31	6	0.9	20.4	18.0	530.0	15.0	20.1	5.0	ND	1.0	ND	ND	ND
SV-41	7/8/02	14:51	6	53.7	0.6	>1000	12.0	11.4	2.2	14.1	16.7	1.0	4.0	2.3	2.7
SV-42 <sup>1</sup>	7/8/02	14:43	6	4.0	53.4	80.0	>1000	3.7	39.5	10.2	ND	1.0	4.0	0.2	0.2
SV-43	7/8/02	12:25	6	9.4	0.8	188.0	16.0	4.2	20.0	15.4	ND	1.0	14.0	2.3	2.3
SV-36	7/9/02	15:05	3	-	21.7	-	434.0	-	11.5	-	7.3	-	ND	-	ND
SV-39	7/9/02	15:16	3	-	3.3	-	66.0	-	2.8	-	14.4	-	ND	-	ND
SV-40	7/9/02	15:20	6	-	25.6	-	518.0	-	28.8	-	ND	-	1.0	-	ND
SV-41	7/9/02	15:10	6	-	0.6	-	12.0	-	2.0	-	18.6	-	ND	-	ND
SV-42	7/9/02	14:55	6	-	49.5	-	992.0	-	36.7	-	ND	-	1.0	-	ND
SV-43	7/9/02	15:25	6	-	1.0	-	20.0	-	19.5	-	ND	-	6.0	-	ND
SV-44	7/11/02	9:20	6	4.0	ND	80.0	ND	4.7	0.1	9.7	20.6	7.0	1.0	2.0	3.1
SV-45	7/11/02	13:25	6	ND	ND	ND	ND	1.8	2.3	12.5	18.3	ND	ND	3.7	2.6

NOTES:

(1) Landfill gas samples taken from these wells in Summa Canisters and submitted for VOC analysis by EPA Method TO-14.

ND = Not Detected

All measurements collected with a Landtec Model GEM-500 Gas Extraction Monitor with a hydrogen sulfide gas monitoring pod. Total VOC's were collected with a Thermo 580B Photoionization Detector fitted with a 10.6eV lamp.

Post-purge measurements were collected after readings stabilized. Typically readings stabilized after 1-2 minutes.

**Table 2**  
**Sullivan's Ledge Superfund Site**  
**Landfill Gas Monitoring Equipment**  
**Measurement Ranges**

Measurment	LandTec GEM 500	Industrial Scientific TMX-412	Thermo OVM 580B PID
Methane	0.1% to 100%	-	-
LEL	0.3% to >100%	1% to 100%	-
Carbon Dioxide	0.1% to 60%	-	-
Carbon Monoxide	-	1 to 999 ppm	-
Oxygen	0.1% to 25%	0.1% to 30%	-
Hydrogen Sulfide	1 to 200 ppm	1 to 999 ppm	-
VOCs	-	-	~0 to 200 ppm w/ 0.1 ppm resolution 200 to 2000 ppm w/ 1 ppm resolution



# SOIL GAS MONITORING FIELD SHEET

Project: Sullivan's Ledge Project No. 200005-010  
 Date: 7/8/01 Time: 14:01  
 Well Location: SV-17 Sampler: JAD  
 Weather Conditions: Sunny, 80's Field Equipment: Landolt/PID  
 Barometric Pressure: ~29 in Hg  
 Required Purge Volume (Note: 1.5 ft of 2" well casing = 1L): -  
 Purge Rate: 0.3 liter/min Purge Time: 3 minutes - Stable

	Pre-Purge Reading	Post-Purge Reading
CH <sub>4</sub> (%)	<u>42.7 %</u>	<u>42.8 %</u>
CH <sub>4</sub> (%LEL)	<u>854 %</u>	<u>856 %</u>
CO <sub>2</sub>	<u>6.9 %</u>	<u>7.0 %</u>
O <sub>2</sub>	<u>6.6 %</u>	<u>6.2 %</u>
H <sub>2</sub> S	<u>0 ppm</u>	<u>1.0 ppm</u>
PID Reading (ppm)	<u>1.8 ppm</u>	<u>2.3 ppm</u>

## NOTES:

Landolt readings taken first



# SOIL GAS MONITORING FIELD SHEET

Project: Sullivan's Ledge Project No. 2000015-010  
 Date: 7/8/02 Time: 16:10  
 Well Location: SV-18 Sampler: CAD  
 Weather Conditions: Sunny, 80's Field Equipment: London, PID  
 Barometric Pressure: ~29 in Hg FO782  
 Required Purge Volume (Note: 1.6 ft of 2" well casing = 1L):  
 Purge Rate: 0.35 L/min Purge Time: 3 mins

	Pre-Purge Reading	Post-Purge Reading
CH <sub>4</sub> (%)	0.0 %	0 %
CH <sub>4</sub> (%LEL)	0.0 %	0.0 %
CO <sub>2</sub>	0.4 %	0.0 %
O <sub>2</sub>	18.9 %	20.2 %
H <sub>2</sub> S	1.1 ppm	1 ppm
PID Reading (ppm)	1.0 ppm	1.0 ppm

## NOTES:

London, London, London  
Readings summary: London, London, London - Captured  
1.5 at



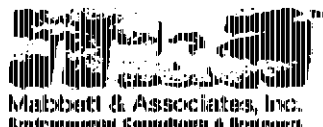
# SOIL GAS MONITORING FIELD SHEET

Project: Sullivan Project No. 2000015-010  
 Date: 7/19/02 Time: 12:08  
 Well Location: SV-34 Sampler: JAD  
 Weather Conditions: Sunny Field Equipment: Lambdapha or PID  
 Barometric Pressure: ~29 in Hg.  
 Required Purge Volume (Note: 1.6ft of 2" well casing = 1L):  
 Purge Rate: 0.3 lit/min Purge Time: 3 mins stable

	Pre-Purge Reading	Post-Purge Reading
CH <sub>4</sub> (%)	<u>5.8</u> %	<u>5.9</u> %
CH <sub>4</sub> (%LEL)	<u>114</u>	<u>118</u>
CO <sub>2</sub>	<u>16.1</u> %	<u>16.6</u> %
O <sub>2</sub>	<u>1.0</u> %	<u>1.4</u> %
H <sub>2</sub> S	<u>0</u> ppm	<u>6</u> ppm
PID Reading (ppm)	<u>1.5</u> ppm	<u>1.0</u> ppm

## NOTES:

Gas detector checked before first.



# SOIL GAS MONITORING FIELD SHEET

Project: Sullivan Project No. 20050051-01A  
 Date: 7/8/02 Time: 12:17  
 Well Location: SN-35 Sampler: JAD  
 Weather Conditions: Sunny Field Equipment: Landtek & PIN  
 Barometric Pressure: 29.7 in Hg.  
 Required Purge Volume (Note: 1.6 ft of 2" well casing = 1L):  
 Purge Rate: 0.5 L/min Purge Time: 3 min, stable

	Pre-Purge Reading	Post-Purge Reading
CH <sub>4</sub> (%)	<u>9.9%</u>	<u>9.7</u>
CH <sub>4</sub> (%LEL)	<u>19.6%</u>	<u>19.6</u>
CO <sub>2</sub>	<u>11.4%</u>	<u>11.3%</u>
O <sub>2</sub>	<u>0.0%</u>	<u>0.0%</u>
H <sub>2</sub> S	<u>0.0 ppm</u>	<u>0.0 ppm</u>
PID Reading (ppm)	<u>0.6 ppm</u>	<u>0.6 ppm</u>

## NOTES:

PID reading taken after landtek purged



# SOIL GAS MONITORING FIELD SHEET

Project: Sullivan's Project No. 20000016-010  
 Date: 7/1/02 Time: 12:25  
 Well Location: SV-36 Sampler: JAD  
 Weather Conditions: Sunny, 80's Field Equipment: Landtec/P10  
 Barometric Pressure: ~29 in. Hg.  
 Required Purge Volume (Note: 1.6ft of 2" well casing = 1L):             
 Purge Rate: 0.3 / litre Purge Time 3 mins, stable

	Pre-Purge Reading	Post-Purge Reading
CH <sub>4</sub> (%)	80.0 %	28.2 %
CH <sub>4</sub> (%LEL)	514 %	544 %
CO <sub>2</sub>	23.1 %	22.3 %
O <sub>2</sub>	0.1 %	0.1 %
H <sub>2</sub> S	1 ppm	3 ppm
PID Reading (ppm)	0.7 ppm	0.2 ppm

## NOTES:

P10 Readings taken after purging with Landtec.

Sullivan's Ledge/ Schaefer at 13-13  
Geological Description: 1st 18' of  
1st 18' of Schaefer 1st 18' of Schaefer  
1st 18' of Schaefer 1st 18' of Schaefer



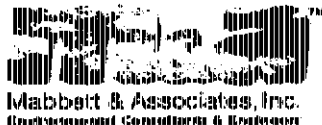
# SOIL GAS MONITORING FIELD SHEET

Project: Sullivan's Project No. 2500015-010  
 Date: 7/8/02 Time: 12:34  
 Well Location: SV-37 Sampler: JAD  
 Weather Conditions: Sunny, 90's Field Equipment: Lanalyzer / PID  
 Barometric Pressure: 29.4 in Hg  
 Required Purge Volume (Note: 1.6 ft of 2" well casing = 1L):  
 Purge Rate: 0.3 L/min Purge Time: 3 min - stable

	Pre-Purge Reading	Post-Purge Reading
CH <sub>4</sub> (%)	15.9 %	2.0 %
CH <sub>4</sub> (%LEL)	19.9 %	3.8 %
CO <sub>2</sub>	19.8 %	18.6 %
O <sub>2</sub>	0.0 %	0.0 %
H <sub>2</sub> S	2 ppm	4 ppm
PID Reading (ppm)	2.7 ppm	2.3 ppm

## NOTES:

14 ppm  
PID readings taken after purging with analyzer



# SOIL GAS MONITORING FIELD SHEET

Project: Sullivan's Ledge Project No. 2000015.010  
 Date: 7/5/02 Time: 14:59  
 Well Location: SV-38 Sampler: JAD/cum  
 Weather Conditions: Sunny 80's Field Equipment: Landtec/PID  
 Barometric Pressure: ~29 in Hg  
 Required Purge Volume (Note: 1.6ft of 2" well casing = 1L):  
 Purge Rate: 0.3 liter/min Purge Time: 3 min stable

	Pre-Purge Reading	Post-Purge Reading
CH <sub>4</sub> (%)	0.5 %	25.4 %
CH <sub>4</sub> (%LEL)	11.2 %	508 %
CO <sub>2</sub>	1.5 %	12.3 %
O <sub>2</sub>	10.4 %	7.0 %
H <sub>2</sub> S	0.0 ppm	0.0 ppm
PID Reading (ppm)	0.2 ppm	0.2 ppm

## NOTES:

Landtec readings taken first



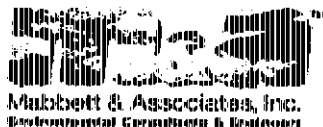
# SOIL GAS MONITORING FIELD SHEET

Project: Sullivan's Ledge Project No. 2000016-010  
 Date: 7/8/02 Time: 14:37  
 Well Location: SV-39 Sampler: JAD  
 Weather Conditions: Sunny, 90's Field Equipment: Landtec/PID  
 Barometric Pressure: 29.9 in Hg  
 Required Purge Volume (Note: 1.6 ft of 2" well casing = 1L):  
 Purge Rate: 0.3 L/min Purge Time: 3 min - stable

	Pre-Purge Reading	Post-Purge Reading
CH <sub>4</sub> (%)	<u>27.0 %</u>	<u>4.0 %</u>
CH <sub>4</sub> (%LEL)	<u>53.6 %</u>	<u>8.0 %</u>
CO <sub>2</sub>	<u>15.1 %</u>	<u>2.6 %</u>
O <sub>2</sub>	<u>0.7 %</u>	<u>15.0 %</u>
H <sub>2</sub> S	<u>Open</u>	<u>1 ppm</u>
PID Reading (ppm)	<u>1.0 ppm</u>	<u>1.0 ppm</u>

## NOTES:

Landtec analyzer stable first



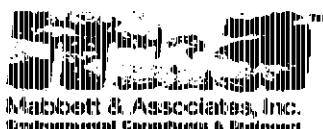
# SOIL GAS MONITORING FIELD SHEET

Project: Sullivan's Ledge Project No. 2000015-010  
 Date: 7/18/02 Time: 14:31  
 Well Location: SV-40 Sampler: JAD/CM  
 Weather Conditions: Sunny, 90's Field Equipment: Landtek/PID  
 Barometric Pressure: 29.1 in Hg  
 Required Purge Volume (Note: 1.5 ft of 2" well casing = 1L):             
 Purge Rate: 0.3 litre/min Purge Time: 3 min Stable

	Pre-Purge Reading	Post-Purge Reading
CH <sub>4</sub> (%)	0.9 %	26.4 %
CH <sub>4</sub> (%LEL)	18 %	530 %
CO <sub>2</sub>	15.0 %	29.1 %
O <sub>2</sub>	5.9 %	0.0 %
H <sub>2</sub> S	1 ppm	0 ppm
PID Reading (ppm)	0 %	0 %

## NOTES:

Cancel each reading before first



# SOIL GAS MONITORING FIELD SHEET

Project: Sullivan's Ledge Project No. 2000015-010  
 Date: 7/8/02 Time: 14:51  
 Well Location: SY-41 Sampler: JAD  
 Weather Conditions: Sunny 80's Field Equipment: Landtec / PID  
 Barometric Pressure: 29.6 in Hg  
 Required Purge Volume (Note: 1.5 ft of 2" well casing = 1L):  
 Purge Rate: 0.3 l/min Purge Time: 3 min stable

	Pre-Purge Reading	Post-Purge Reading
CH <sub>4</sub> (%)	53.7 %	0.6 %
CH <sub>4</sub> (%LEL)	>>1000 %	12 %
CO <sub>2</sub>	11.4 %	2.2 %
O <sub>2</sub>	14.1 %	18.7 %
H <sub>2</sub> S	1 ppm	4 ppm
PID Reading (ppm)	2.2 ppm	2.2 ppm

## NOTES:

Landtec readings taken first



# SOIL GAS MONITORING FIELD SHEET

Project: Sullivan's Ledge Project No. 2000015-010  
 Date: 7/8/02 Time: 14:43  
 Well Location: SV-42 Sampler: JAD  
 Weather Conditions: Sunny, 80's Field Equipment: Landtec / PID  
 Barometric Pressure: ~29.5 in. Hg  
 Required Purge Volume (Note: 1.6ft of 2" well casing = 1L):  
 Purge Rate: 0.3 L/min Purge Time: 3 mins stable

	Pre-Purge Reading	Post-Purge Reading	
CH <sub>4</sub> (%)	4.0 %	53.4 %	15:06
CH <sub>4</sub> (%LEL)	30 %	721000 %	52.4
CO <sub>2</sub>	3.7 %	38.5 %	55
O <sub>2</sub>	10.2 %	0.0 %	31.20
H <sub>2</sub> S	1 ppm	4 ppm	0.0
PID Reading (ppm)	0.2 ppm	0.2 ppm	8 ppm
			0.8 ppm

## NOTES:

Landtec readings taken first



Project: Sullivan's Ledge	Project No. 2000015-010
Date: 7/8/02	Time: 14:25
Well Location: SV-43	Sampler: JAP / CLM
Weather Conditions: Sunny, 80's	Field Equipment: Sonotek / PID
Barometric Pressure: ~29.6 Hg	
Required Purge Volume (Note: 1.6ft of 2" well casing = 1L):	
Purge Rate: 0.35 L/min	Purge Time: 3 min. 45 sec.

	Pre-Purge Reading	Post-Purge Reading
CH <sub>4</sub> (%)	0.4 %	0.9 %
CH <sub>4</sub> (%LEL)	1.8 %	1.6 %
CO <sub>2</sub>	4.2 %	2.0 %
O <sub>2</sub>	15.4 %	0 %
H <sub>2</sub> S	1 ppm	1.4 ppm
PID Reading (ppm)	2.3 ppm	2.3 ppm

**NOTES:**

1. *Chloroceryle alpestris* 2. *Chloroceryle alpestris* 3. *Chloroceryle alpestris* 4. *Chloroceryle alpestris*

# Additional Point in Cinema Parking Lot



## SOIL GAS MONITORING FIELD SHEET

Project: Sullivan's Lodge Project No. 200005-OLD  
 Date: 7/11/02 Time: 9:20  
 Well Location: SV-44 Sampler: CLM / GAP  
 Weather Conditions: Sunny, 80's Field Equipment: Landstar / PID  
 Barometric Pressure: 29.82 inHg  
 Required Purge Volume (Note: 1.6ft of 2" well casing = 1L):  
 Purge Rate: 1/2 liter / min Purge Time: 1 min. → 3 liter, stable

	Pre-Purge Reading	Post-Purge Reading
CH <sub>4</sub> (%)	4.0 %	0.0 %
CH <sub>4</sub> (%LEL)	80 %	0.0 %
CO <sub>2</sub>	4.7 %	0.1 %
O <sub>2</sub>	9.7 %	20.8 %
H <sub>2</sub> S	7 ppm	1 ppm
PID Reading (ppm)	2.0 ppm	3.1 ppm

### NOTES:

Additional Point in Cinema Parking Lot  
Landstar Reading taken first

# Additional Point in Days Inn Parking Lot



## SOIL GAS MONITORING FIELD SHEET

Project: Sullivan's Ledge Project No. 200005-010

Date: 7/10/02 Time: 13:25

Well Location: SV-45? Days Inn Sampler: JAD/CLM

Weather Conditions: Sunny, 90's Field Equipment: Lanchem / PID

Barometric Pressure: 29.56 in Hg.

Required Purge Volume (Note: 1.6ft of 2" well casing = 1L): ✓

Purge Rate: 0.3 L/min Purge Time: 1 hour

	Pre-Purge Reading	Post-Purge Reading
CH <sub>4</sub> (%)	0.0 %	0.0 %
CH <sub>4</sub> (%LEL)	0.0 %	0.0 %
CO <sub>2</sub>	1.8 %	2.3 %
O <sub>2</sub>	12.5 %	18.3 %
H <sub>2</sub> S	0 ppm	0 ppm
PID Reading (ppm)	2.7 ppm	2.6 ppm

NOTES: Location readings taken first

Submittal Ledger Superseded SHS  
VAPOR ANALYTICAL Requires EPA method 13-14  
July 2002

	GM-2R		GM-5		GM-20		SV-16		SV-35		SV-36		SV-42	
	Southwest Corner		West Center		East Center		Northeast Corner		West Center		West Center		Southeast Corner	
	7/10/02		7/10/02		7/10/02		7/8/02		7/8/02		7/8/02		7/8/02	
Compound	ppbv	uG/m <sup>3</sup>	ppbv	uG/m <sup>3</sup>	ppbv	uG/m <sup>3</sup>	ppbv	uG/m <sup>3</sup>	ppbv	uG/m <sup>3</sup>	ppbv	uG/m <sup>3</sup>	ppbv	uG/m <sup>3</sup>
Freon 12	<32	<160	<5.1	<25	<5.5	<28	<24	<120	<5.4	<27	<5.3	<27	<5.6	<50
Freon 114	<32	<230	<5.1	<36	<5.5	<39	<24	<170	<5.4	<38	<5.3	<38	<5.9	<70
Freon 113	<32	<250	<5.1	<39	<5.5	<43	<24	<190	<5.4	<42	<5.3	<41	<5.9	<77
Freon 11	<32	<180	<5.1	<29	<5.5	<31	<24	<140	<5.4	<31	<5.3	<30	<5.9	<56
1,1-Dichloroethane	<32	<130	<5.1	<20	<5.5	<22	<24	<99	<5.4	<22	<5.3	<21	<5.0	<40
1,1,1-Trichloroethane	<32	<250	<5.1	<39	<5.5	<43	<24	<190	<5.4	<42	<5.3	<41	<5.9	<77
1,1,2-Trichloroethane	<32	<130	<5.1	<21	<5.5	<23	<24	<100	<5.4	<22	<5.3	<21	<5.9	<41
1,1,2-Dichloroethane	<32	<130	<5.1	<20	<5.5	<22	<24	<98	<5.4	<22	<5.3	<21	<5.9	<40
1,1,1-Trichloroethane	<32	<160	<5.1	<25	<5.5	<27	<24	<120	<5.4	<27	<5.3	<26	<5.9	<40
1,1,1-Trichloroethane	<32	<180	<5.1	<28	<5.5	<30	<24	<130	<5.4	<30	<5.3	<29	<5.9	<55
Carbon Tetrachloride	<32	<210	<5.1	<32	<5.5	<35	<24	<180	<5.4	<34	<5.3	<34	<5.9	<63
1,2-Dichloroethane	<32	<130	<5.1	<21	<5.5	<23	<24	<100	<5.4	<22	<5.3	<22	<5.9	<41
1,2-Dichloroethane	<32	<160	<5.1	<25	<5.5	<27	<24	<130	<5.4	<30	<5.3	<29	<5.9	<55
1,2-Dichloropropane	<32	<150	<5.1	<24	<5.5	<25	<24	<110	<5.4	<25	<5.3	<25	<5.9	<46
1,3-Dichloropropane	<32	<150	<5.1	<23	<5.5	<25	<24	<110	<5.4	<25	<5.3	<24	<5.9	<46
1,1,2-Trichloroethane	<32	<160	<5.1	<25	<5.5	<30	<24	<130	<5.4	<30	<5.3	<29	<5.9	<55
1,1,2-Trichloroethane	<32	<220	<5.1	<35	<5.5	<38	<24	<170	<5.4	<37	<5.3	<36	<5.9	<68
1,2-Dibromochloroethane (EDB)	<32	<250	<5.1	<40	<5.5	<43	<24	<190	<5.4	<42	<5.3	<41	<5.9	<77
Chlorobenzene	<32	<150	<5.1	<24	<5.5	<25	<24	<110	<5.4	<25	<5.3	<25	<5.9	<46
Ethyl Benzene	<32	<140	<5.1	<22	<5.5	<24	<24	<110	<5.4	<23	<5.3	<23	<5.9	<44
p-Xylene	<32	<140	<5.1	<22	<5.5	<24	<24	<110	<5.4	<23	<5.3	<23	<5.9	<44
m-Xylene	<32	<140	<5.1	<22	<5.5	<24	<24	<110	<5.4	<23	<5.3	<23	<5.9	<44

Table 3  
Sullivan's Ledge Superfund Site  
Vapor Analysis Results EPA Method TO-14  
July 2002

Compound	GM-2R Southwest Corner 7/10/02		GM-5 West Center 7/10/02		GM-20 East Center 7/10/02		SV-16 Northeast Corner 7/8/02		SV-35 West Center 7/8/02		SV-36 West Center 7/8/02		SV-42 Southeast Corner 7/8/02	
	ppbv	uG/m <sup>3</sup>	ppbv	uG/m <sup>3</sup>	ppbv	uG/m <sup>3</sup>	ppbv	uG/m <sup>3</sup>	ppbv	uG/m <sup>3</sup>	ppbv	uG/m <sup>3</sup>	ppbv	uG/m <sup>3</sup>
trans-1,2-Dichloroethene	<130	<520	<20	<82	<22	<89	<97	<390	<22	<87	<21	<85	<40	<160
Vinyl Acetate	<130	<480	<20	<72	<22	<79	<97	<350	<22	<77	<21	<76	<40	<140
2-Butanone (Methyl Ethyl Ketone)	<130	<390	<20	<61	<22	<60	<97	<290	<22	<65	<21	<64	<40	<120
Hexane	ND	ND	1200	4500	2700E	9700E	<97	<350	<22	<77	26	94	<40	<140
Tetrahydrofuran	<130	<390	<20	<61	<22	<66	<97	<290	<22	<65	<21	<64	<40	<120
1,2-Dichloroethane	1100	4000	190	450	ND	2200	<97	<340	240	1200	220	790	280	970
1,4-Dioxane	<130	<470	<20	<74	<22	<80	<97	<360	<22	<79	<21	<76	<40	<140
Bromochloromethane	<130	<880	<20	<140	<22	<150	<97	<660	<22	<150	<21	<140	<40	<270
2,4-Methyl-2-pentanone	<130	<540	<20	<84	<22	<62	<97	<400	<22	<90	<21	<88	<40	<180
2-Nonanone	<130	<540	<20	<84	<22	<62	<97	<400	<22	<90	<21	<88	<40	<180
Dibromochloromethane	<130	<1100	<20	<180	<22	<190	<97	<840	<22	<190	<21	<180	<40	<340
Bromodichloromethane	<130	<1400	<20	<210	<22	<230	<97	<1000	<22	<230	<21	<220	<40	<420
4-Ethyltoluene	<130	<640	<20	<160	<22	<110	<97	<480	<22	<110	<21	<100	<40	<200
Ethanol	<130	<290	<20	<39	<22	<42	<97	<180	<22	<41	<21	<41	<40	<75
Methyl tert-Butyl Ether	<130	<470	<20	<74	<22	<61	<97	<360	<22	<79	<21	<78	<40	<140
		3700	<20	<84	ND	2200	<97	<400		630	<21	<86		510

Notes:

All samples collected in a 1-liter Summa Canister and analyzed for VOCs using method TO-14 by Air Toxics Ltd.

E = Exceeds instrument calibration range

J = Estimated value

VAPOR SCREENING DATA

Compound	GM-2R Southwest Corner 7/10/02		GM-5 West Center 7/10/02		GM-20 East Center 7/10/02		SV-16 Northeast Corner 7/8/02		SV-35 West Center 7/8/02		SV-36 West Center 7/8/02		SV-42 Southeast Corner 7/8/02	
	%		%		%		%		%		%		%	
Methane	80.2	--	49.1	--	18.8	--	43.4	--	9.7	--	28.2	--	55.4	--
Carbon Dioxide	14.5	--	15.8	--	10.8	--	6.6	--	11.3	--	22.3	--	38.5	--
Oxygen	0.0	--	0.0	--	5.1	--	8.8	--	0.0	--	0.1	--	0.0	--
Hydrogen Sulfide	0.0	--	20.0	--	23.0	--	1.0	--	0.0	--	3.0	--	4.0	--

**Table 4**  
**Sullivan's Ledge Superfund Site**  
**Soil Boring Grain Size Analysis**  
**July 2002**

Sample ID	Depth (feet)	Percent Passing by Sieve Size				
		#4	#10	#40	#100	#200
Comp1	0 - 6	90	84	69	42	27
Comp1	6 - 12	84	78	61	37	23
Comp2	0 - 6	93	89	80	51	30
Comp2	6 - 12	87	79	59	37	25

**SAMPLE DESIGNATION:**

Comp1     Composite from Borings SB-1, SB-5, and SB-7 (closer to landfill)  
 Comp2     Composite from Borings SB-2, SB-6, and SB-9 (closer to Days inn)

**Table 5**  
**Sullivan's Ledge Superfund Site**  
**Landfill Gas Monitoring Results**  
**July 2002**

Well Location	Date	Time Sampled	Methane (%)		Methane % LEL		Carbon Dioxide (%)		Oxygen (%)		Hydrogen Sulfide (ppm)		VOC's (ppm)	
			pre-purge	post-purge	pre-purge	post-purge	pre-purge	post-purge	pre-purge	post-purge	pre-purge	post-purge	pre-purge	post-purge
GM-1R	7/10/02	14:20	43.5	42.7	816.0	856.0	16.1	16.7	0.8	ND	ND	ND	ND	ND
GM-2R <sup>1</sup>	7/10/02	14:20	28.1	60.2	545.0	>1000	8.7	14.5	0.5	ND	ND	ND	ND	0.3
GM-3R	7/10/02	13:56	43.0	30.9	846.0	616.0	15.0	13.9	1.3	ND	ND	ND	0.3	ND
GM-4R	7/10/02	13:45	48.2	42.3	964.0	846.0	15.1	15.7	1.3	ND	5.0	ND	0.3	0.3
GM-5 <sup>1</sup>	7/10/02	13:35	ND	40.1	ND	982.0	8.4	15.8	12.4	ND	ND	20.0	0.3	ND
GM-6	7/10/02	13:15	14.8	ND	296.0	ND	11.2	6.5	8.3	12.2	ND	ND	1.5	ND
GM-7	7/10/02	12:55	17.3	17.5	346.0	350.0	14.5	17.9	1.1	0.0	2.0	ND	0.3	ND
GM-8	7/10/02	9:18	15.8	0.4	316.0	8.0	11.0	13.5	10.9	7.1	ND	ND	1.1	0.3
GM-9	7/10/02	9:05	20.0	16.4	400.0	330.0	20.1	29.0	0.7	ND	9.0	11.0	1.1	ND
GM-10	7/10/02	9:45	0.5	33.9	10.0	675.0	14.3	29.9	5.8	ND	ND	ND	0.3	0.3
GM-11	7/10/02	8:45	0.4	26.5	6.0	530.0	16.4	26.8	5.2	ND	ND	34.0	2.6	0.3
GM-12	7/10/02	8:24	2.1	0.2	41.0	4.0	ND	21.4	20.6	0.2	ND	ND	3.4	0.7
GM-13	7/10/02	10:00	12.3	3.4	146.0	88.0	12.3	15.8	0.5	ND	ND	ND	0.7	0.3
GM-14	7/10/02	14:40	0.4	14.1	22.0	282.0	3.4	12.3	8.2	1.0	12.0	22.0	4.3	2.6
GM-15	7/10/02	9:40	19.6	14.7	392.0	294.0	14.0	11.5	ND	3.1	41.0	25.0	0.7	1.5
GM-16	7/10/02	9:30	6.3	ND	128.0	ND	4.9	6.3	5.0	10.2	1.0	ND	1.5	1.1
GM-17	7/10/02	9:15	ND	6.2	ND	126.0	0.1	5.0	20.4	0.7	ND	9.0	0.6	0.3
GM-18	7/10/02	8:35	Water in line, opened well head, water inside well head.											
GM-19	7/10/02	8:25	21.8	21.5	432.0	430.0	8.8	8.6	2.2	2.4	7.0	4.0	1.5	ND
GM-20 <sup>1</sup>	7/10/02	8:11	23.0	18.8	460.0	376.0	11.9	10.6	0.3	5.1	77.0	23.0	0.3	0.3
GM-21	7/10/02	8:00	1.8	ND	36.0	ND	4.0	6.5	20.5	13.7	1.0	ND	1.5	1.5
GM-22	7/10/02	15:35	0.9	ND	16.0	ND	3.9	5.9	9.7	5.9	ND	ND	1.8	ND
GM-23	7/10/02	9:00	5.8	0.6	106.0	12.0	3.3	1.8	10.8	16.3	ND	ND	0.3	1.1

**NOTES:**

(1) Landfill gas samples taken from these wells in Gumma Canisters and submitted for VOC analysis by EPA Method TO-14.

ND = Not Detected

All measurements collected on July 10, 2002 with a Landtec Model GLM-500 Gas Extraction Monitor with a hydrogen sulfide gas monitoring pod. Total VOCs were collected with a Thermo 580B Photoionization Detector fitted with a 10.6eV lamp.

Post-purge measurements were collected after approximately 10 minutes of purging. Measurements typically stabilized after 1-2 minutes of purging.

Table 6  
Sullivan's Ledge Superfund Site  
Gas Vent Monitoring  
July 2002

Sample Location	Date	Time	Methane (%)		Methane (%LEL)		Carbon Dioxide (%)		Oxygen (%)		Hydrogen Sulfide (ppm)		Total VOCs (ppm)	
			pre-purge	post-purge	pre-purge	post-purge	pre-purge	post-purge	pre-purge	post-purge	pre-purge	post-purge	pre-purge	Post-purge
GV-1	7/25/02	12:42	0.4	0.2	6.0	4.0	2.7	1.1	12.0	19.3	ND	ND	1.7	1.7
GV-2	7/25/02	12:30	0.6	2.6	20.0	52.0	3.3	11.3	9.9	6.5	ND	ND	3.4	1.7
GV-3	7/25/02	12:19	ND	3.7	ND	74.0	0.2	4.1	19.3	14.9	ND	ND	1.7	1.7
GV-4 <sup>(1)</sup>	7/25/02	12:07	ND	ND	ND	ND	0.6	3.9	15.7	13.1	ND	ND	3.4	1.7
GV-5	7/25/02	11:52	0.7	5.2	14.0	104.0	1.5	2.4	18.4	17.7	ND	ND	3.4	ND
GV-6	7/25/02	11:41	ND	ND	ND	ND	ND	ND	20.0	20.0	ND	2	3.4	3.4
GV-7	7/25/02	11:30	ND	ND	ND	ND	ND	ND	20.8	21.0	ND	ND	3.4	ND
GV-8	7/25/02	11:17	0.3	ND	5.0	ND	0.1	0.1	20.9	20.9	ND	ND	ND	ND
GV-9	7/25/02	11:06	4.1	0.9	82.0	10.0	0.5	0.5	19.7	19.7	ND	ND	1.7	ND
GV-10	7/25/02	10:49	2.6	9.8	50.0	192.0	1.5	1.5	18.3	18.0	ND	ND	1.7	ND
GV-11	7/25/02	10:35	3.2	4.9	64.0	92.0	2.7	2.6	17.7	17.2	ND	ND	3.4	ND
GV-12	7/25/02	10:21	0.2	ND	4.0	ND	ND	ND	20.6	21	ND	ND	3.4	1.7
GV-13	7/25/02	10:14	2.4	5.9	28.0	112.0	0.2	1.9	20.9	18.9	ND	ND	3.4	ND
GV-14	7/25/02	10:01	ND	0.4	ND	7.0	0.5	1.0	20.1	20.1	ND	ND	6.8	5.1
GV-15	7/25/02	12:18	ND	5.9	ND	118.0	10.3	11.3	9.1	7.9	ND	ND	1.7	1.7

NOTES:

<sup>(1)</sup> Screen hanging off vent, sample was taken at a depth 10' from vent outlet.

All measurements collected on July 25, 2002 with a Lantec Model GEM-500 Gas Extraction Monitor with a hydrogen sulfide gas monitoring pod. Total VOC's were collected with a Thermo 580B Photoionization Detector fitted with a 10.6eV lamp.

Lantec Model GEM-500 was typically run for approximately 8 to 10 minutes until readings appeared to stabilize.

Gas vent measurements collected by placement of GEM-500 and Thermo 580B sample tubing approximately 4' into the outlet of the gas vent well. Tubing was inserted into vent opening, pushed, twisted, pulled, etc. to try to advance tubing down vent. At all vents where screens were fully intact tubing could not be advanced further into vent well.

ND = Not Detected

Table 7  
Sullivan's Ledge Superfund Site  
Leachate Gas Screening Results  
Adjacent Buildings & Structures  
July 2002

Date	Location	Description	Instrument	Results						
				Methane (%)	LEL (%)	Carbon Dioxide (%)	Carbon Monoxide (ppm)	Oxygen (%)	Hydrogen Sulfide (ppm)	VOCs (ppm)
7/10/02	Treatment Plant	Influent vault north Breathing zone	LandTec GEM-500	ND	ND	ND		20.4	ND	
			Industrial Sci. TMX412		ND		ND	21.0	ND	
			Thermo Env 580							0.3
7/10/02	Treatment Plant	Influent vault north Below grate	LandTec GEM-500	ND	ND	ND		20.5	ND	
			Industrial Sci. TMX412		ND		ND	21.1	ND	
			Thermo Env 580							1.1
7/10/02	Treatment Plant	Influent vault south Breathing zone	LandTec GEM-500	ND	ND	ND		20.7	ND	
			Industrial Sci. TMX412		ND		ND	21.0	ND	
			Thermo Env 580							0.7
7/10/02	Treatment Plant	Influent vault south Below grate	LandTec GEM-500	ND	ND	ND		20.6	ND	
			Industrial Sci. TMX412		ND		ND	21.0	ND	
			Thermo Env 580							0.7
7/10/02	Treatment Plant	Sump B Breathing zone	LandTec GEM-500	ND	ND	ND		20.8	ND	
			Industrial Sci. TMX412		ND		ND	21.1	ND	
			Thermo Env 580							0.7
7/10/02	Treatment Plant	Sump B Below grate	LandTec GEM-500	ND	ND	ND		20.8	ND	
			Industrial Sci. TMX412		ND		ND	21.1	ND	
			Thermo Env 580							0.7
7/10/02	Treatment Plant	Sump C Breathing zone	LandTec GEM-500	ND	ND	ND		20.8	ND	
			Industrial Sci. TMX412		ND		ND	21.1	ND	
			Thermo Env 580							0.7
7/10/02	Treatment Plant	Sump C Below grate	LandTec GEM-500	ND	ND	ND		20.8	ND	
			Industrial Sci. TMX412		ND		ND	21.1	ND	
			Thermo Env 580							0.7
7/10/02	Treatment Plant	Sump D Breathing zone	LandTec GEM-500	ND	ND	ND		20.8	ND	
			Industrial Sci. TMX412		ND		ND	21.1	ND	
			Thermo Env 580							0.7
7/10/02	Treatment Plant	Sump D Below grate	LandTec GEM-500	ND	ND	ND		20.8	ND	
			Industrial Sci. TMX412		ND		ND	21.1	ND	
			Thermo Env 580							0.7
7/10/02	Treatment Plant	Sump E Breathing zone	LandTec GEM-500	ND	ND	ND		20.8	ND	
			Industrial Sci. TMX412		ND		ND	21.1	ND	
			Thermo Env 580							0.7
7/10/02	Treatment Plant	Sump E Below grate	LandTec GEM-500	ND	ND	ND		20.8	ND	
			Industrial Sci. TMX412		ND		ND	21.1	ND	
			Thermo Env 580							0.7
7/10/02	Treatment Plant	Sump near sulfuric acid tank Breathing zone	LandTec GEM-500	ND	ND	ND		20.8	ND	
			Industrial Sci. TMX412		ND		ND	21.2	ND	
			Thermo Env 580							0.7
7/10/02	Treatment Plant	Sump near sulfuric acid tank Below grate	LandTec GEM-500	ND	ND	ND		20.8	ND	
			Industrial Sci. TMX412		ND		ND	21.1	ND	
			Thermo Env 580							0.7
7/10/02	Treatment Plant	Sump near sodium hydroxide tank Breathing zone	LandTec GEM-500	ND	ND	ND		20.9	ND	
			Industrial Sci. TMX412		ND		ND	21.1	ND	
			Thermo Env 580							0.7
7/10/02	Treatment Plant	Sump near sodium hydroxide tank Below grate	LandTec GEM-500	ND	ND	ND		20.9	ND	
			Industrial Sci. TMX412		ND		ND	21.1	ND	
			Thermo Env 580							0.7
7/10/02	Treatment Plant	Electric Room Ground level	LandTec GEM-500	ND	ND	ND		20.7	ND	
			Industrial Sci. TMX412		ND		ND	21.1	ND	
			Thermo Env 580							0.7
7/10/02	Treatment Plant	Electric Room Breathing zone	LandTec GEM-500	ND	ND	ND		20.7	ND	
			Industrial Sci. TMX412		ND		ND	21.1	ND	
			Thermo Env 580							0.7

**Table 7**  
**Sullivan's Ledge Superfund Site**  
**Landfill Gas Screening Results**  
**Adjacent Buildings & Structures**  
**July 2002**

Date	Location	Description	Instrument	Results						
				Methane (%)	LEL (%)	Carbon Dioxide (%)	Carbon Monoxide (ppm)	Oxygen (%)	Hydrogen Sulfide (ppm)	VOCs (ppm)
7/10/02	Treatment Plant	Electric Room Above breathing zone	LandTec GEM-500	ND	ND	ND		20.7	ND	0.7
			Industrial Sci. TMAX412		ND		ND	21.1	ND	
			Thermo Env 580							
7/10/02	Treatment Plant	Utility Room (water main) Ground level	LandTec GEM-500	ND	ND	ND		20.8	ND	0.7
			Industrial Sci. TMAX412		ND		ND	21.2	ND	
			Thermo Env 580							
7/10/02	Treatment Plant	Utility Room (water main) Breathing zone	LandTec GEM-500	ND	ND	ND		20.8	ND	0.7
			Industrial Sci. TMAX412		ND		ND	21.2	ND	
			Thermo Env 580							
7/10/02	Treatment Plant	Office Room Ground level	LandTec GEM-500	ND	ND	ND		20.9	ND	0.7
			Industrial Sci. TMAX412		ND		ND	21.1	ND	
			Thermo Env 580							
7/10/02	Treatment Plant	Office Room Breathing zone	LandTec GEM-500	ND	ND	ND		20.8	ND	0.7
			Industrial Sci. TMAX412		ND		ND	21.1	ND	
			Thermo Env 580							
7/10/02	Treatment Plant	Office Room Above breathing zone	LandTec GEM-500	ND	ND	ND		20.8	ND	0.7
			Industrial Sci. TMAX412		ND		ND	21.1	ND	
			Thermo Env 580							
7/10/02	Treatment Plant	Above office space Floor	LandTec GEM-500	ND	ND	ND		20.8	ND	0.7
			Industrial Sci. TMAX412		ND		ND	21.1	ND	
			Thermo Env 580							
7/10/02	Treatment Plant	Above office space Breathing zone	LandTec GEM-500	ND	ND	ND		20.8	ND	0.7
			Industrial Sci. TMAX412		ND		ND	21.1	ND	
			Thermo Env 580							
7/10/02	Treatment Plant	Above office space Above breathing zone	LandTec GEM-500	ND	ND	ND		20.8	ND	0.7
			Industrial Sci. TMAX412		ND		ND	21.1	ND	
			Thermo Env 580							
7/10/02	Treatment Plant	Catwalk above influent tank Catwalk level	LandTec GEM-500	ND	ND	ND		20.8	ND	0.7
			Industrial Sci. TMAX412		ND		ND	21.1	ND	
			Thermo Env 580							
7/10/02	Treatment Plant	Catwalk above influent tank Breathing zone	LandTec GEM-500	ND	ND	ND		20.7	ND	0.7
			Industrial Sci. TMAX412		ND		ND	21.1	ND	
			Thermo Env 580							
7/10/02	Treatment Plant	Catwalk above influent tank Above breathing zone	LandTec GEM-500	ND	ND	ND		20.7	ND	0.7
			Industrial Sci. TMAX412		ND		ND	21.1	ND	
			Thermo Env 580							
7/10/02	Treatment Plant	Catwalk above effluent tank Catwalk level	LandTec GEM-500	ND	ND	ND		20.7	ND	0.7
			Industrial Sci. TMAX412		ND		ND	21.1	ND	
			Thermo Env 580							
7/10/02	Treatment Plant	Catwalk above effluent tank Breathing zone	LandTec GEM-500	ND	ND	ND		20.7	ND	1.1
			Industrial Sci. TMAX412		ND		ND	21.1	ND	
			Thermo Env 580							
7/10/02	Treatment Plant	Catwalk above effluent tank Above breathing zone	LandTec GEM-500	ND	ND	ND		20.8	ND	1.1
			Industrial Sci. TMAX412		ND		ND	21.1	ND	
			Thermo Env 580							
7/10/02	Treatment Plant	Catwalk near flash mix flocculator Catwalk level	LandTec GEM-500	ND	ND	ND		20.8	ND	1.1
			Industrial Sci. TMAX412		ND		ND	21.1	ND	
			Thermo Env 580							
7/10/02	Treatment Plant	Catwalk near flash mix flocculator Breathing zone	LandTec GEM-500	ND	ND	ND		20.8	ND	0.7
			Industrial Sci. TMAX412		ND		ND	21.1	ND	
			Thermo Env 580							
7/10/02	Treatment Plant	Catwalk near flash mix flocculator Above breathing zone	LandTec GEM-500	ND	ND	ND		20.8	ND	0.7
			Industrial Sci. TMAX412		ND		ND	21.1	ND	
			Thermo Env 580							
7/10/02	Treatment Plant	Catwalk above sludge tank Catwalk level	LandTec GEM-500	ND	ND	ND		20.8	ND	0.7
			Industrial Sci. TMAX412		ND		ND	21.1	ND	
			Thermo Env 580							

**Table 7**  
**Sullivan's Ledge Superfund Site**  
**Landfill Gas Screening Results**  
**Adjacent Buildings & Structures**  
**July 2002**

Date	Location	Description	Instrument	Results						
				Methane (%)	LEL (%)	Carbon Dioxide (%)	Carbon Monoxide (ppm)	Oxygen (%)	Hydrogen Sulfide (ppm)	VOCs (ppm)
7/10/02	Treatment Plant	Catwalk above sludge tank Breathing zone	LandTec GEM-500	ND	ND	ND		20.6	ND	
			Industrial Sci. TMX412		ND		ND	21.1	ND	
			Thermo Env 580							0.7
7/10/02	Treatment Plant	Catwalk above sludge tank Above breathing zone	LandTec GEM-500	ND	ND	ND		20.7	ND	
			Industrial Sci. TMX412		ND		ND	21.1	ND	
			Thermo Env 580							0.7
7/10/02	Treatment Plant	atwalk above backwash holding tank Catwalk level	LandTec GEM-500	ND	ND	ND		20.8	ND	
			Industrial Sci. TMX412		ND		ND	21.1	ND	
			Thermo Env 580							0.7
7/10/02	Treatment Plant	atwalk above backwash holding tank Breathing zone	LandTec GEM-500	ND	ND	ND		20.6	ND	
			Industrial Sci. TMX412		ND		ND	21.1	ND	
			Thermo Env 580							0.7
7/10/02	Treatment Plant	atwalk above backwash holding tank Above breathing zone	LandTec GEM-500	ND	ND	ND		20.8	ND	
			Industrial Sci. TMX412		ND		ND	21.1	ND	
			Thermo Env 580							0.7
7/10/02	Treatment Plant Catwalk landing	Between sludge and effluent tanks Catwalk level	LandTec GEM-500	ND	ND	ND		20.8	ND	
			Industrial Sci. TMX412		ND		ND	21.1	ND	
			Thermo Env 580							0.7
7/10/02	Treatment Plant Catwalk landing	Between sludge and effluent tanks Breathing zone	LandTec GEM-500	ND	ND	ND		20.8	ND	
			Industrial Sci. TMX412		ND		ND	21.1	ND	
			Thermo Env 580							0.7
7/10/02	Treatment Plant Catwalk landing	Between sludge and effluent tanks Above breathing zone	LandTec GEM-500	ND	ND	ND		20.8	ND	
			Industrial Sci. TMX412		ND		ND	21.1	ND	
			Thermo Env 580							0.7
7/10/02	Sullivan's Ledge Catch Basin	Treatment Plant Driveway breathing zone	LandTec GEM-500	ND	ND	ND		20.7	ND	
			Industrial Sci. MG140		ND		ND	21.1	ND	
			Thermo Env 580							1.1
7/10/02	Sullivan's Ledge Catch Basin	Treatment Plant Driveway Below grate	LandTec GEM-500	ND	ND	ND		20.7	ND	
			Industrial Sci. MG140		ND		ND	21.0	ND	
			Thermo Env 580							1.1
7/10/02	Hatheway Road Catch Basin (#1)	Breathing zone	LandTec GEM-500	ND	ND	ND		20.7	ND	
			Industrial Sci. MG140		ND		ND	21.1	ND	
			Thermo Env 580							0.7
7/10/02	Hatheway Road Catch Basin (#1)	Below grate	LandTec GEM-500	ND	ND	ND		20.8	ND	
			Industrial Sci. MG140		ND		ND	21.3	ND	
			Thermo Env 580							0.7
7/10/02	Hatheway Road Catch Basin (#2)	Breathing zone	LandTec GEM-500	ND	ND	ND		20.9	ND	
			Industrial Sci. MG140		ND		ND	21.3	ND	
			Thermo Env 580							0.7
7/10/02	Hatheway Road Catch Basin (#2)	Below grate	LandTec GEM-500	ND	ND	ND		20.8	ND	
			Industrial Sci. MG140		ND		ND	21.2	ND	
			Thermo Env 580							0.7
7/10/02	Hatheway Road Catch Basin (#3)	Breathing zone	LandTec GEM-500	ND	ND	ND		20.6	ND	
			Industrial Sci. MG140		ND		ND	21.1	ND	
			Thermo Env 580							0.3
7/10/02	Hatheway Road Catch Basin (#3)	Below grate	LandTec GEM-500	ND	ND	ND		20.8	ND	
			Industrial Sci. MG140		ND		1.0	21.2	ND	
			Thermo Env 580							0.3
7/10/02	Hatheway Road Catch Basin (#4)	Breathing zone	LandTec GEM-500	ND	ND	ND		20.6	ND	
			Industrial Sci. MG140		ND		ND	21.3	ND	
			Thermo Env 580							0.3
7/10/02	Hatheway Road Catch Basin (#4)	Below grate	LandTec GEM-500	ND	ND	ND		20.8	ND	
			Industrial Sci. MG140		ND		1.5	21.1	ND	
			Thermo Env 580							ND
7/10/02	Hatheway Road Catch Basin (#5)	Breathing zone	LandTec GEM-500	ND	ND	ND		20.9	ND	
			Industrial Sci. MG140		ND		ND	21.2	ND	
			Thermo Env 580							1.1
7/10/02	Hatheway Road Catch Basin (#5)	Below grate	LandTec GEM-500	ND	ND	ND		20.9	ND	
			Industrial Sci. MG140		ND		ND	21.2	ND	
			Thermo Env 580							1.1

Table 7  
Sullivan's Ledge Superfund Site  
Landfill Gas Screening Results  
Adjacent Buildings & Structures  
July 2002

Date	Location	Description	Instrument	Results						
				Methane (%)	LEL (%)	Carbon Dioxide (%)	Carbon Monoxide (ppm)	Oxygen (%)	Hydrogen Sulfide (ppm)	VOCs (ppm)
7/10/02	Hathaway Road Catch Basin (#6)	Breathing zone	LandTec GEM-500	ND	ND	ND		20.9	ND	
			Industrial Sol. MG140		ND		ND	21.2	ND	
			Thermo Env 580							1.1
7/10/02	Hathaway Road Catch Basin (#6)	Below grate	LandTec GEM-500	ND	ND	ND		20.7	ND	
			Industrial Sol. MG140		ND		ND	21.0	ND	
			Thermo Env 580							0.3
7/10/02	Hathaway Road Catch Basin (#7)	Breathing zone	LandTec GEM-500	ND	ND	ND		20.8	ND	
			Industrial Sol. MG140		ND		1.0	21.2	ND	
			Thermo Env 580							1.1
7/10/02	Hathaway Road Catch Basin (#7)	Below grate	LandTec GEM-500	ND	ND	ND		20.6	ND	
			Industrial Sol. MG140		ND		ND	21.2	ND	
			Thermo Env 580							1.5
7/10/02	Hathaway Road Catch Basin (#8)	Breathing zone	LandTec GEM-500	ND	ND	ND		20.8	ND	
			Industrial Sol. MG140		ND		1.0	21.2	ND	
			Thermo Env 580							1.1
7/10/02	Hathaway Road Catch Basin (#8)	Below grate	LandTec GEM-500	ND	ND	ND		20.8	ND	
			Industrial Sol. MG140		ND		ND	21.0	ND	
			Thermo Env 580							1.0
7/10/02	Hathaway Road Catch Basin (#9)	Breathing zone	LandTec GEM-500	ND	ND	ND		20.8	ND	
			Industrial Sol. MG140		ND		1.0	21.2	ND	
			Thermo Env 580							1.5
7/10/02	Hathaway Road Catch Basin (#9)	Below grate	LandTec GEM-500	ND	ND	ND		20.8	ND	
			Industrial Sol. MG140		ND		1.0	21.2	ND	
			Thermo Env 580							1.5
7/10/02	New Bedford Inn Catch Basin 1	N central Parking lot Breathing Zone	LandTec GEM-500	ND	ND	ND		20.8	ND	
			Industrial Sol. MG140		ND		1.0	21.2	ND	
			Thermo Env 580							ND
7/10/02	New Bedford Inn Catch Basin 1	N central Parking lot DRY	LandTec GEM-500	ND	ND	ND		20.8	ND	
			Industrial Sol. MG140		ND		2.0	21.1	ND	
			Thermo Env 580							0.3
7/10/02	New Bedford Inn Catch Basin 2	NE corner of Parking lot Breathing Zone	LandTec GEM-500	ND	ND	ND		20.7	ND	
			Industrial Sol. MG140		ND		2.0	21.2	ND	
			Thermo Env 580							0.7
7/10/02	New Bedford Inn Catch Basin 2	NE corner of Parking lot DRY	LandTec GEM-500	ND	ND	ND		20.7	ND	
			Industrial Sol. MG140		ND		2.0	21.2	ND	
			Thermo Env 580							0.7
7/10/02	New Bedford Inn Catch Basin 3	East Parking lot Breathing Zone	LandTec GEM-500	ND	ND	ND		20.8	ND	
			Industrial Sol. MG140		ND		2.0	21.3	ND	
			Thermo Env 580							ND
7/10/02	New Bedford Inn Catch Basin 3	East Parking lot DRY	LandTec GEM-500	ND	ND	ND		20.7	ND	
			Industrial Sol. MG140		ND		1.0	21.2	ND	
			Thermo Env 580							ND
7/10/02	New Bedford Inn Catch Basin 4	East Parking lot Breathing Zone	LandTec GEM-500	ND	ND	ND		20.7	ND	
			Industrial Sol. MG140		ND		1.0	21.4	ND	
			Thermo Env 580							0.3
7/10/02	New Bedford Inn Catch Basin 4	East Parking lot Above water level	LandTec GEM-500	ND	ND	ND		20.7	ND	
			Industrial Sol. MG140		ND		1.0	21.2	ND	
			Thermo Env 580							0.3
7/10/02	New Bedford Inn Catch Basin 5	East Parking lot Breathing Zone	LandTec GEM-500	ND	ND	ND		20.7	ND	
			Industrial Sol. MG140		ND		2.0	21.4	ND	
			Thermo Env 580							ND
7/10/02	New Bedford Inn Catch Basin 5	East Parking lot DRY	LandTec GEM-500	ND	ND	ND		20.7	ND	
			Industrial Sol. MG140		ND		2.0	21.2	ND	
			Thermo Env 580							0.3
7/10/02	New Bedford Inn Catch Basin 5	East Parking lot Breathing Zone	LandTec GEM-500	ND	ND	ND		20.7	ND	
			Industrial Sol. MG140		ND		2.0	21.3	ND	
			Thermo Env 580							0.3

**Table 7**  
**Sullivan's Ledge Superfund Site**  
**Landfill Gas Screening Results**  
**Adjacent Buildings & Structures**  
**July 2002**

Date	Location	Description	Instrument	RESULTS						VOCs (ppm)
				Methane (%)	LEL (%)	Carbon Dioxide (%)	Carbon Monoxide (ppm)	Oxygen (%)	Hydrogen Sulfide (ppm)	
7/10/02	New Bedford Inn Catch Basin 8	East Parking lot Above water level	LandTec GEM-500	ND	ND	ND		20.7	ND	
			Industrial Sol. MG140		ND		2.0	21.4	ND	
			Thermo Env 580							0.7
7/10/02	New Bedford Inn	Room 369 Breathing Zone	LandTec GEM-500	ND	ND	ND		20.6	ND	
			Industrial Sol. MG140		ND		ND	21.2	ND	
			Thermo Env 580							ND
7/10/02	New Bedford Inn	Room 282 Breathing Zone	LandTec GEM-500	ND	ND	ND		20.8	ND	
			Industrial Sol. MG140		ND		ND	21.2	ND	
			Thermo Env 580							ND
7/10/02	New Bedford Inn	Room 355 Breathing zone	LandTec GEM-500	NU	NU	NU		20.6	NU	
			Industrial Sol. MG140		ND		ND	21.2	ND	
			Thermo Env 580							ND
7/10/02	New Bedford Inn	Room 103 Breathing zone	LandTec GEM-500	ND	ND	ND		20.6	ND	
			Industrial Sol. MG140		ND		ND	21.2	ND	
			Thermo Env 580							ND
7/10/02	New Bedford Inn	Room 106 Breathing zone	LandTec GEM-500	ND	ND	ND		20.6	ND	
			Industrial Sol. MG140		ND		ND	21.3	ND	
			Thermo Env 580							ND
7/10/02	New Bedford Inn	Room 110 Breathing zone	LandTec GEM-500	ND	ND	ND		20.6	ND	
			Industrial Sol. MG140		ND		1.0	21.3	ND	
			Thermo Env 580							ND
7/10/02	New Bedford Inn	Room 112 Breathing zone	LandTec GEM-500	ND	ND	ND		20.6	ND	
			Industrial Sol. MG140		ND		ND	21.3	ND	
			Thermo Env 580							ND
7/10/02	New Bedford Inn	Room 115 Breathing zone	LandTec GEM-500	ND	ND	ND		20.6	ND	
			Industrial Sol. MG140		ND		1.0	21.3	ND	
			Thermo Env 580							ND
7/10/02	New Bedford Inn	Room 203 Breathing zone	LandTec GEM-500	ND	ND	ND		20.6	ND	
			Industrial Sol. MG140		ND		ND	21.2	ND	
			Thermo Env 580							ND
7/10/02	New Bedford Inn	Room 206 Breathing zone	LandTec GEM-500	ND	ND	ND		20.6	ND	
			Industrial Sol. MG140		ND		ND	21.2	ND	
			Thermo Env 580							ND
7/10/02	New Bedford Inn	Room 213 Breathing zone	LandTec GEM-500	ND	ND	ND		20.6	ND	
			Industrial Sol. MG140		ND		ND	21.2	ND	
			Thermo Env 580							ND
7/10/02	New Bedford Inn	Room 305 Breathing Zone	LandTec GEM-500	ND	ND	ND		20.6	ND	
			Industrial Sol. MG140		ND		ND	21.2	ND	
			Thermo Env 580							ND
7/10/02	New Bedford Inn	Bar room Ground level	LandTec GEM-500	ND	ND	ND		20.6	ND	
			Industrial Sol. MG140		ND		11 <sup>(1)</sup>	21.5	ND	
			Thermo Env 580							ND
7/10/02	New Bedford Inn	Bar room Breathing Zone	LandTec GEM-500	ND	ND	ND		20.5	ND	
			Industrial Sol. MG140		ND		13 <sup>(1)</sup>	21.5	ND	
			Thermo Env 580							ND
7/10/02	New Bedford Inn	Bar room Above Breathing Zone	LandTec GEM-500	ND	ND	ND		20.5	ND	
			Industrial Sol. MG140		ND		42 <sup>(1)</sup>	21.6	ND	
			Thermo Env 580							ND
7/10/02	New Bedford Inn	Front Desk Area Breathing Zone	LandTec GEM-500	NU	NU	NU		20.6	ND	
			Industrial Sol. MG140		ND		1.0	21.4	2	
			Thermo Env 580							ND
7/10/02	New Bedford Inn	Walkway near Lobby Breathing Zone	LandTec GEM-500	NU	NU	NU		20.6	ND	
			Industrial Sol. MG140		ND		10 <sup>(1)</sup>	21.5	ND	
			Thermo Env 580							ND
7/10/02	New Bedford Inn	Rangier Room Breathing Zone	LandTec GEM-500	ND	ND	ND		20.6	ND	
			Industrial Sol. MG140		ND		2 <sup>(1)</sup>	21.5	ND	
			Thermo Env 580							ND

Table 7  
Rutland's Ledge Superfund Site  
Landfill Gas Screening Results  
Adjacent Buildings & Structures  
July 2002

Date	Location	Description	Instrument	Results						
				Methane (%)	LEL (%)	Carbon Dioxide (%)	Carbon Monoxide (ppm)	Oxygen (%)	Hydrogen Sulfide (ppm)	VOCs (ppm)
7/10/02	New Bedford Inn	Kitchen Breathing Zone	LandTec GEM-500	ND	ND	ND		20.8	ND	
			Industrial Sol. MG140		ND		8 (H)	21.4	ND	
			Thermo Env 580							ND
7/10/02	New Bedford Inn	Hallway near Pool Breathing Zone	LandTec GEM-500	ND	ND	ND		20.5	ND	
			Industrial Sol. MG140		ND		8 (H)	21.4	ND	
			Thermo Env 580							ND
7/10/02	New Bedford Inn	Hallway near Pool Above breathing Zone	LandTec GEM-500	ND	ND	ND		20.5	ND	
			Industrial Sol. IMX412		ND		4.0	21.2	ND	
			Thermo Env 580							ND
7/10/02	New Bedford Inn	Central Heating Room Breathing Zone	LandTec GEM-500	ND	ND	ND		20.8	ND	
			Industrial Sol. MG140		ND		ND	21.3	ND	
			Thermo Env 580							ND
7/10/02	New Bedford Inn	Rear of Central Heating Room Breathing Zone	LandTec GEM-500	ND	ND	ND		20.6	ND	
			Industrial Sol. MG140		ND		ND	21.2	ND	
			Thermo Env 580							ND
7/10/02	New Bedford Inn	Electrical Piping to Room Above breathing Zone	LandTec GEM-500	ND	ND	ND		20.8	ND	
			Industrial Sol. IMX412		ND		ND	21.3	ND	
			Thermo Env 580							ND
7/10/02	New Bedford Inn	Laundry Room Breathing Zone	LandTec GEM-500	ND	ND	ND		20.8	ND	
			Industrial Sol. MG140		ND		ND	21.5	ND	
			Thermo Env 580							ND
7/10/02	New Bedford Inn	Rear of Laundry Room Breathing Zone	LandTec GEM-500	ND	ND	ND		20.8	ND	
			Industrial Sol. MG140		ND		ND	21.5	ND	
			Thermo Env 580							ND
7/10/02	New Bedford Inn	Catch Basin in South Courtyard Below Grate	LandTec GEM-500	ND	ND	ND		20.8	ND	
			Industrial Sol. MG140		ND		2.0	21.5	ND	
			Thermo Env 580							ND
7/10/02	New Bedford Inn	Sewer Manhole in North Courtyard Breathing Zone	LandTec GEM-500	ND	ND	ND		20.8	ND	
			Industrial Sol. MG140		ND		ND	21.4	ND	
			Thermo Env 580							ND
7/10/02	New Bedford Inn	Sewer Manhole in North Courtyard Breathing Zone	LandTec GEM-500	ND	ND	ND		20.8	ND	
			Industrial Sol. MG140		ND		ND	21.4	ND	
			Thermo Env 580							ND
7/10/02	New Bedford Inn	Sewer Manhole in North Courtyard Breathing Zone	LandTec GEM-500	ND	ND	ND		20.8	ND	
			Industrial Sol. MG140		ND		ND	21.4	ND	
			Thermo Env 580							ND
7/10/02	New Bedford Inn	Sewer Manhole in North Courtyard Breathing Zone	LandTec GEM-500	ND	ND	ND		20.8	ND	
			Industrial Sol. MG140		ND		ND	21.4	ND	
			Thermo Env 580							ND
7/10/02	New Bedford Inn	Sewer Manhole in North Courtyard Breathing Zone	LandTec GEM-500	ND	ND	ND		20.8	ND	
			Industrial Sol. MG140		ND		ND	21.4	ND	
			Thermo Env 580							ND

Table 7  
Sullivan's Ledge Superfund Site  
Landfill Gas Screening Results  
Adjacent Buildings & Structures  
July 2002

Date	Location	Description	Instrument	Results						
				Methane (%)	LEL (%)	Carbon Dioxide (%)	Carbon Monoxide (ppm)	Oxygen (%)	Hydrogen Sulfide (ppm)	VOCs (ppm)
7/11/02	Rosie's Restaurant	Parking Lot	LandTec GEM-500	ND	ND	ND		21.0	ND	
			Industrial Sol. MG140		ND		ND	21.0	ND	
			Thermo Env 580							0.8
7/11/02	Rosie's Restaurant	East Parking Lot	LandTec GEM-500	ND	ND	ND		21.1	ND	
			Industrial Sol. MG140		ND		ND	21.0	ND	
			Thermo Env 580							1.4
7/11/02	Rosie's Restaurant	Bar Area	LandTec GEM-500	ND	ND	ND		21.1	ND	
			Industrial Sol. MG140		ND		ND	21.0	ND	
			Thermo Env 580							1.4
7/11/02	Rosie's Restaurant	Dining Area	LandTec GEM-500	ND	ND	ND		21.0	ND	
			Industrial Sol. MG140		ND		ND	20.9	ND	
			Thermo Env 580							1.4
7/11/02	Rosie's Restaurant	Kitchen	LandTec GEM-500	ND	ND	0.1		21.0	ND	
			Industrial Sol. MG140		ND		0.0	21.0	ND	
			Thermo Env 580							0.8
7/11/02	Rosie's Restaurant	Storage Area	LandTec GEM-500	ND	ND	0.1		21.1	ND	
			Industrial Sol. MG140		ND		0.0	20.9	ND	
			Thermo Env 580							1.6
7/11/02	Rosie's Restaurant	Rear of Building	LandTec GEM-500	ND	ND	ND		21.2	ND	
			Industrial Sol. MG140		ND		0.0	21.0	ND	
			Thermo Env 580							0.8
7/11/02	Rosie's Restaurant	Catch Basin	LandTec GEM-500	ND	ND	ND		21.1	ND	
			Industrial Sol. MG140		ND		ND	20.9	ND	
			Thermo Env 580							0.8

Notes:

All measurements collected on July 10, 2002 and July 11, 2002 with a Landtec Model GEM-500 Gas Extraction Monitor with a hydrogen sulfide gas monitoring pod, an Industrial Scientific TMX 412 and a Thermo Environmental 580B Photoionization Detector (PID).

Measurements taken after 2-3 minutes of purging

ND = Not Detected



# SOIL GAS MONITORING FIELD SHEET

Project: Sullivan's Ledge Project No. 2000045-010  
 Date: 7/10/02 Time: 14:20  
 Well Location: GM-2R Sampler: CLM HEAD  
 Weather Conditions: Sunny, 90's Field Equipment: Landtec / PID  
 Barometric Pressure: ~29 in. Hg  
 Required Purge Volume (Note: 1.6ft of 2" well casing = 1L): 16 Liters  
 Purge Rate: 1 L/min Purge Time: 16 mins

	Pre-Purge Reading	Post-Purge Reading
CH <sub>4</sub> (%)	0.1 %	0.2 %
CH <sub>4</sub> (%LEL)	0.1 %	0.2 %
CO <sub>2</sub>	8.7 %	14.5 %
O <sub>2</sub>	9.6 %	0.0 %
H <sub>2</sub> S	0 ppm	0 ppm
PID Reading (ppm)	0 ppm	0.3 ppm

## NOTES:

Landtec read again - higher than first

Summary Calculation:

Start @ 15:14

Initial Pressure = 20

End Pressure = 7

End @ 15:14



# SOIL GAS MONITORING FIELD SHEET

Project: Sullivan's Lodge Project No. 200005-010  
 Date: 7/10/02 Time: 13:56  
 Well Location: S-11-3R Sampler: CLM STAP  
 Weather Conditions: Sunny, 90's Field Equipment: Landtec / PID  
 Barometric Pressure: ~29 in Hg  
 Required Purge Volume (Note: 1.6ft of 2" well casing = 1L): 11.5 Litres  
 Purge Rate: 1.4 L/min Purge Time: 1.4 minutes

	Pre-Purge Reading	Post-Purge Reading
CH <sub>4</sub> (%)	<u>12.0 %</u>	<u>20.9 %</u>
CH <sub>4</sub> (%LEL)	<u>84.6 %</u>	<u>61.6 %</u>
CO <sub>2</sub>	<u>15.0 %</u>	<u>13.9 %</u>
O <sub>2</sub>	<u>1.3 %</u>	<u>0.0 %</u>
H <sub>2</sub> S	<u>0.0 ppm</u>	<u>0.0 ppm</u>
PID Reading (ppm)	<u>0.3 ppm</u>	<u>0.0 ppm</u>

## NOTES:

Landtec Readings taken first.



# SOIL GAS MONITORING FIELD SHEET

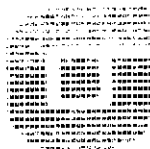
Project: Sullivan's Ledge Project No. 2000015-010  
 Date: 7/10/02 Time: 13:45  
 Well Location: G-M-4R Sampler: CLM / RAD  
 Weather Conditions: Sunny, 90's Field Equipment: Landtec / PID  
 Barometric Pressure: 29.9 in Hg  
 Required Purge Volume (Note: 1.0ft of 2" well casing = 1L): 16 litres  
 Purge Rate: 4 L/min Purge Time: 4 mins

	Pre-Purge Reading	Post-Purge Reading
CH <sub>4</sub> (%)	42.2 %	42.3 %
CH <sub>4</sub> (%LEL)	964 %	846 %
CO <sub>2</sub>	15.1 %	15.7 %
O <sub>2</sub>	1.3 %	0.0 %
H <sub>2</sub> S	5 ppm	0 ppm
PID Reading (ppm)	0.3 ppm	0.3 ppm

## NOTES:

Sensitise readings taken first

## APPENDIX B



**O'BRIEN & GERE**  
ENGINEERS, INC.

Superfund Records Center

SITE: \_\_\_\_\_

BREAK: \_\_\_\_\_

OTHER: \_\_\_\_\_

August 15, 2003

Mr. David O. Lederer  
Remedial Project Manager  
U.S. Environmental Protection Agency (HBO)  
Region 1  
1 Congress Street, Suite 1100  
Boston, MA 02114-2023

Re: Sullivan's Ledge Superfund Site  
Gas Extraction System Design

File: 5509/28602 #2

Dear Dave:

Enclosed please find for your review the Contract Drawings for the gas extraction system to be constructed at the Sullivan's Ledge Superfund Site. The design drawings include the following:

- G-1 - Existing Site Plan
- G-2 - Gas Extraction System Site Plan
- G-3 - Gas Extraction System Plans, Section, and Notes
- G-4 - Miscellaneous Details
- E-1 - Partial Site Plan
- E-2 - Wiring Diagrams

The following are responses to comments contained in correspondence from MADEP and USEPA dated May 29, 2003 and May 30, 2003 respectively. The responses are provided in same order as presented in the referenced correspondence.

**Comment 1:** **General:** For the final design, it is recommended that the PRPs provide details of monitoring to be performed to evaluate system performance. The PRPs should discuss how the quarterly monitoring results will be used to evaluate system performance. Also, future soil gas surveys should be performed to demonstrate that the landfill gas migration issue is being mitigated.

**Response 1:** The Field Sampling Plan (FSP) for Surface Water, Sediment, and Landfill Gas Monitoring at the Site is being prepared for submittal to the agencies in accordance with section V.B.2 of the Statement of Work (SOW) for the Site, and Sections 3 and 5 of the "Post-Construction Environmental Monitoring Plan, Sullivan's Ledge Superfund Site, New Bedford, Massachusetts" (O'Brien & Gere, 1997). The objective of the surface water and sediment monitoring program is to evaluate the effectiveness of the cap in



preventing mobility and transport of contaminants from soils within the disposal area. The objective of the landfill gas monitoring program is to evaluate the potential off-site migration of landfill gas.

**Comment 2:** **Page 5, Section 2.4.1:** While there were no objectionable odors detected during the pilot test, pumping from additional locations could cause odors during operation of the full-scale system. It is suggested that the final design have an option to address odors if a problem occurs.

**Response 2:** Refer to the correspondence dated June 17, 2003 related to the air dispersion modeling.

**Comment 3:** **Page 5, Section 2.4.2 and Table 2:** The % LEL in the stack discharge was quite high during much of the pilot test and would be expected to be high during any startup periods. Please provide information, such as preliminary design calculations and/or features (e.g., introduction of excess air), which shows that explosive conditions are not a concern.

**Response 3:** An inlet air dilution valve and flame arrester will be installed as shown on Sheet G-3 of the Contract Drawings.

**Comment 4:** **Page 9, Section 3.1, 2<sup>nd</sup> paragraph:** The text should indicate that the extraction system will draw from GV-1, GV-3, GV-13, GV-8, GV-12 and GV-14. The first sentence of this paragraph implies that it will only draw from GV-1, GV-3, and GV-13. Please clarify.

**Response 4:** The text will be advised as follows: "Through a combination of the proposed gas extraction header system and existing perforated PVC gas vent pipe, the gas extraction system will extract landfill gas directly from GV-1, GV-3, GV-8, GV-12, GV-13, and GV-14."

**Comment 5:** **Pages 9 & 10, Section 3.1 and Figure 3:** Please provide calculations showing that the blower is sized to create the extraction well radii of influence depicted.

**Response 5:** The specified blower radius of influence calculations are provided in Attachment 1.

**Comment 6:** **Page 13, Section 4:** It is suggested that a plan or schedule for stack testing of VOCs should be included in the final design to confirm that operation of the extraction system is consistently under regulatory discharge limits.

**Response 6:** A landfill gas extraction and monitoring section will be added to the approved O&M Manual. The gas monitoring section will include a schedule for stack testing of VOCs.

**Comment 7:** **Page 13, Section 4:** It is suggested to evaluate and estimate operation time based on assumed landfill gas generation rates to provide an overall assessment of the operation and maintenance needs. The approved O&M plan for the site should be revised to include O&M procedures for this system.

**Response 7:** The O&M Manual will be revised to include a section that addresses the landfill gas extraction system operation and maintenance requirements.

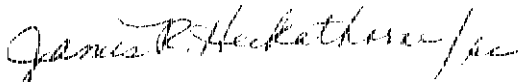
Mr. David O. Lederer  
August 15, 2003  
Page 3

- Comment 8: **Page 13, Section 4, last bullet, 1<sup>st</sup> sentence:** The statement that the discharge from the system will not pose a health risk or public nuisance needs to be justified through comparison to regulatory criteria. Modeling via SCREEN3 is recommended to determine if concentrations at or beyond the property boundary exceed criteria.
- Response 8: Air dispersion modeling has been conducted and the results were provided in the correspondence from O'Brien & Gere Engineers to the USEPA dated June 17, 2003. The referenced correspondence has been provided with this letter as Attachment 2.
- Comment 9: **Table 2, Footnote 4:** Footnote 4 is confusing because it indicates that the ">>>" symbol represents greater than 100% of the LEL. However, there are several results shown that are above 100% LEL. Please clarify the use of the symbol.
- Response 9: Based on Table 2, Footnote 1: The gas meter used from December 19 through December 24, 2002 was a Landtec Model GEM-2000 Gas Extraction Monitor, which has an out-of-range limit of 100% LEL. All subsequent stack readings were taken with a Landtec Model GEM-500 Gas Extraction Monitor, which has the capability of reading methane beyond the 100% LEL.

Please contact me if you have any questions concerning this document.

Very truly yours,

O'BRIEN & GERE ENGINEERS, INC

  
James R. Heckathorn, PE  
Vice President

*L:\DW71 Projects\5509\28602\2\_corres\LEDERGasdesignComments2.doc*

Enclosure

cc:	E. Vaughn	S. Wood	S. Alfonse
	D. Dwight	E. Bertaut	J. Shanahan

## Equations

$$K_i = \frac{P_i * R^2 * \ln\left(\frac{R}{r}\right) * \mu_{LGF} * \rho_{ref} * Q * E_a}{M * (P_1^2 - P_2^2) * \left(\frac{WD}{L}\right)} \quad \text{Eqn 2-13 U.S.A.C.E. Landfill Gas Extraction Design Handbook}$$

Where

$K_i$  = intrinsic permeability of refuse  
 $P_1$  = gage internal landfill pressure  
 $P_v$  = gage vacuum pressure at well head  
 $R$  = radius of influence  
 $r$  = radius of well borehole  
 $\mu_{LGF}$  = viscosity of LGF  
 $\rho_{ref}$  = refuse density  
 $Q$  = Minimum blower flow rate  
 $E_a$  = efficiency of collection system  
 $M$  = Landfill capacity  
 $WD$  = Well screen length  
 $L$  = Landfill depth

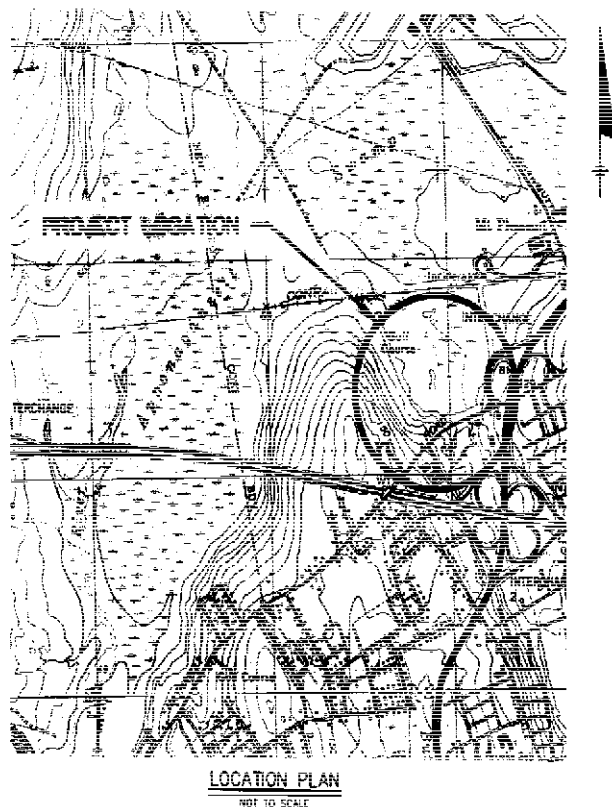
$$K = K_i \left( \frac{\rho g}{\mu} \right) \quad \text{Eqn. 4-18 Applied Hydrogeology 3<sup>rd</sup> Edition, Fetter}$$

Where

$K$  = Hydraulic conductivity  
 $K_i$  = Intrinsic permeability  
 $\rho$  = Density of fluid  
 $g$  = acceleration due to gravity  
 $\mu$  = dynamic viscosity of fluid

## Assumptions

- $P_i$  = 0 psf -- Table 5 Gas Extraction Pilot Study (O'Brien & Gere, May'03)
- $P_v$  = 3" Hg -- Table 4A Gas Extraction Pilot Study (O'Brien & Gere, May'03)
- $R$  = 250 ft
- $r$  = 0.5 ft
- $\mu_{LGF}$  =  $2.77 \times 10^{-7}$  -- Table 1 Geocomposite Gas Pressure Relief Layer Under Surface Impoundments (Landfilldesign.com)
- $\rho_{ref}$  = 62.4 pcf -- pg 2.13 Rowe'99
- $Q$  = 200 CFM -- Table 2 Gas Extraction Pilot Study (O'Brien & Gere, May'03)
- $L$  = 70 ft
- $WD$  = 5 ft



Contract Drawings

# SULLIVAN'S LEDGE SUPERFUND SITE

## GAS EXTRACTION SYSTEM

SULLIVAN'S LEDGE SITE GROUP  
CITY OF NEW BEDFORD  
BRISTOL COUNTY, MASSACHUSETTS

AUGUST 2003

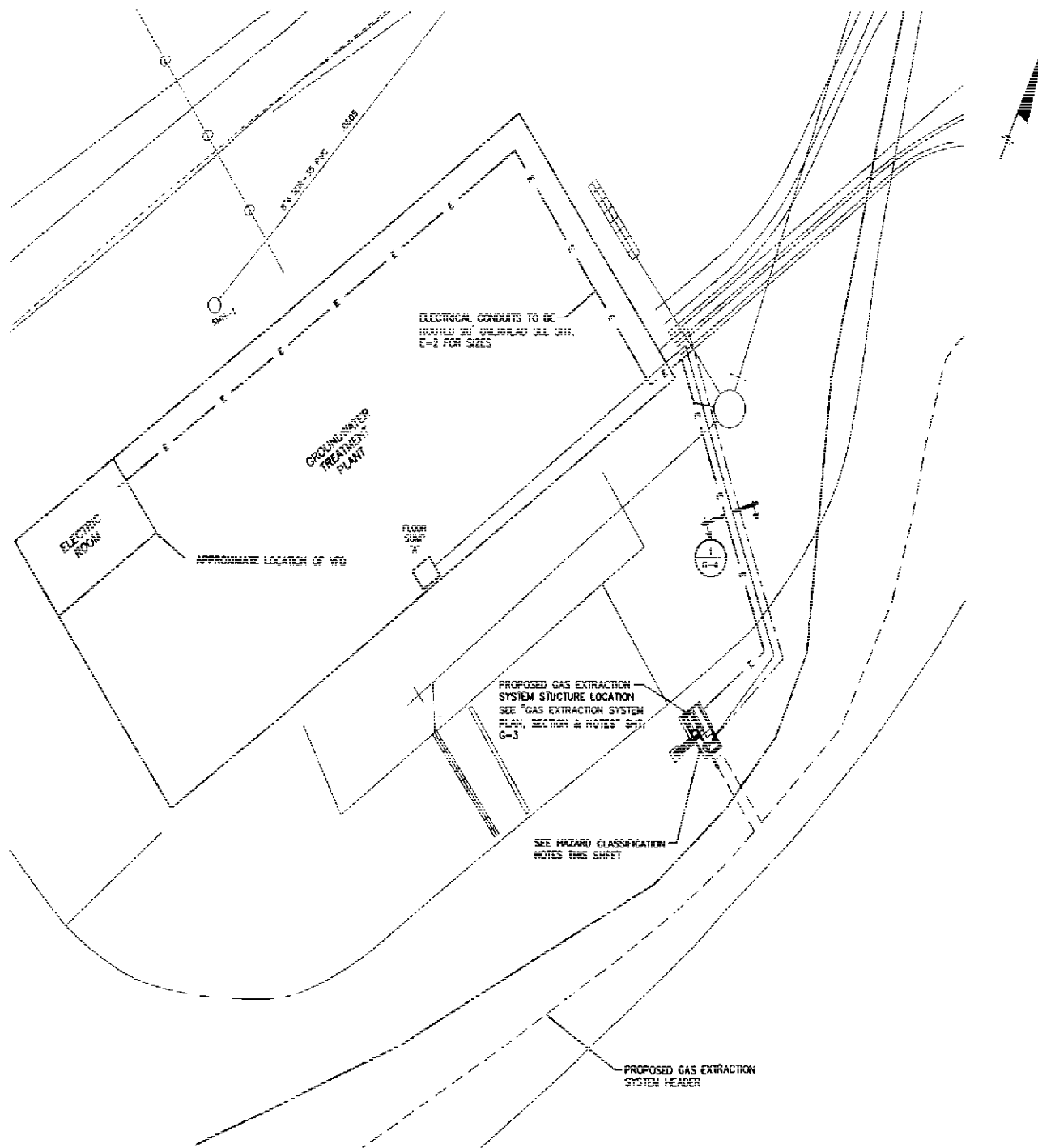


**O'BRIEN & GERE**  
ENGINEERS INC.

### INDEX TO DRAWINGS

TITLE SHEET	
G-1	EXISTING SITE PLAN
G-2	GAS EXTRACTION SYSTEM SITE PLAN
G-3	GAS EXTRACTION SYSTEM PLAN, SECTION & NOTES
G-4	MISCELLANEOUS DETAILS
E-1	PARTIAL SITE PLAN
E-2	WRING DIAGRAMS

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GENERAL NOTES: ALL ELECTRICAL DRAWINGS

1. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE AND SCHEDULE ALL WORK WITH THE OWNER, ENGINEER AND OTHER CONTRACTORS.
2. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH APPLICABLE PROVISIONS OF THE NATIONAL FIREPROOFING CODE (LOCAL, STATE AND ANY LEGAL CODES).
3. ALL CONTACT SHALL BE RIGID STEEL CONTACT (RSC) ONLY, UNLESS OTHERWISE NOTED. MINIMUM CONTACT SIZE SHALL BE 3/4" UNLESS OTHERWISE NOTED.
4. ALL WIRING SHALL BE TYPE THHN/THWN CABLES UNLESS OTHERWISE NOTED. MINIMUM CABLE BRANCH CIRCUIT WIRING SHALL BE #12.
5. ALL ELECTRICAL EQUIPMENT SHALL BE IDENTIFIED WITH ENGRAVED LAMINATED LABELS.
6. ALL INTRER AND BRANCH CIRCUIT CONDUITS SHALL CONTAIN A 1/2" DIA. RIGID CONDUIT CONNECTION UNLESS OTHERWISE NOTED.

AREAS CLASSIFIED AS HAZARDOUS:

THE AREA ABOUT THE GAS EXTRACTION PAD IS CLASS 1, GROUP 0 WITH THE AREAS DEFINED AS FOLLOWS:

[illegible]

1. 3 FOOT RADIUS AROUND THE EXHAUST VENT.

**FIGURE 2** **AMC**

- 2 AREA SURROUNDING EQUIPMENT PAD UP TO 10 FEET IN ALL DIRECTIONS\* AND IS 12 INCHES WIDE

1. **RESEARCH**  
2. **RESEARCH**  
3. **RESEARCH**

- ```

- - - - - PROPOSED PVC GAS EXTRACTION
              PIPE HEADER SYSTEM
- - - - - INSTANTANEOUS MOUNTING
- - - - - LIMITS OF CAP
- - - - - 1/2" COMPRESSOR AIR
              COPPER TUBING
- - - - - ELECTRICAL CONDUIT
- - - - - 1/4" 1" PRIMARY
              CONDENSATE CONVEYANCE PIPE
              INSIDE 4" HOPE CONTAINMENT
              TUNING

```

|     |         |                       |  |  |    |
|-----|---------|-----------------------|--|--|----|
|     |         |                       |  |  |    |
|     |         |                       |  |  |    |
|     |         |                       |  |  |    |
| A   | 8/14/03 | FOIAED FBI LTR REVIEW |  |  |    |
| NO. | DATE    | REVISION              |  |  | IN |



SULLIVAN'S LEDGE SUPERFUND SITE  
NEW BEDFORD, MASSACHUSETTS  
GAS EXTRACTION SYSTEM

ELECTRICAL

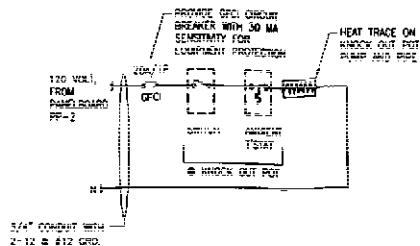
### PARTIAL SITE PLAN

PRELIMINARY  
NOT FOR  
CONSTRUCTION

DATE: 8/14/03

|              |                |
|--------------|----------------|
| IN CHARGE OF | FILE NO.       |
| DESIGNED BY  | 5509.28602.112 |
| CHECKED BY   | DATE           |
| DRAWN BY     | ATTACHED 2003  |

11

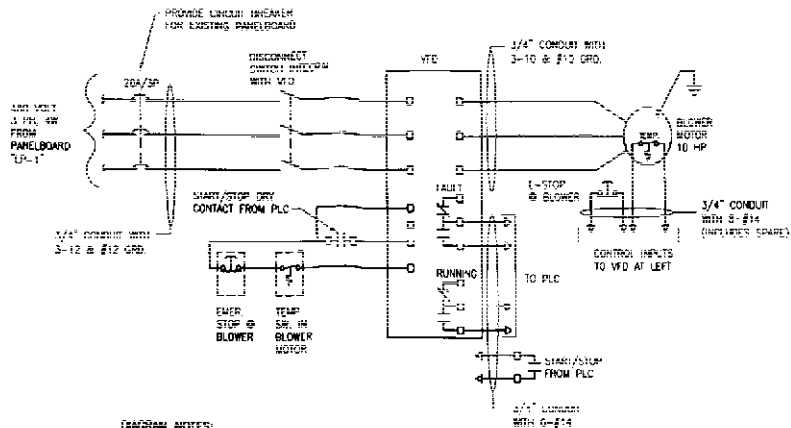


**DIAGRAM NOTES:**

1. EXISTING PANELBOARD PP-2 IS LOCATED IN ELECTRIC ROOM.
2. HAZARDOUS AREA: HEAT TRACE CABLE, AMBIENT THERMOSTAT AND SWITCH ARE LOCATED WITHIN A CLASS I, DIVISION 1, GROUP D AREA.
3. HEAT TRACE CABLE SHALL BE PROVIDED IN ACCORDANCE WITH ALL EXISTING EXHAUSTION EQUIPMENT.

**GAS EXTRACTION KNOCK OUT POT  
HEAT TRACE WIRING DIAGRAM**

HOT TO SCALE



**DIAGRAM NOTES:**

1. VFD - VARIABLE FREQUENCY DRIVE SHALL BE INSTALLED WITHIN EXISTING ELECTRIC ROOM, NEXT TO PLC CONTROL (S.E. LUTHER) COORDINATE LOCATION WITH OTHER LAYOUTS. PANELBOARD LPT IS LOCATED IN ELECTRIC ROOM.
2. HAZARDOUS AREA: BLOWER MOTOR AND EMERGENCY STOP SWITCH ARE LOCATED WITHIN A CLASS I, DIVISION 2, GROUP D AREA.
3. VFD AND BLOWER MOTOR SHALL BE PROVIDED AS PART OF PACKAGE WITH GAS EXTRACTION EQUIPMENT.

**GAS EXTRACTION BLOWER MOTOR  
WIRING DIAGRAM**

HOT TO SCALE

THIS DRAWING WAS PREPARED AT THE SCALE INDICATED IN THE TITLE BLOCK. DIMENSIONS IN THE TITLE BLOCK ARE TO BE MAINTAINED UNLESS OTHERWISE INDICATED. DIMENSIONS ARE TO BE MAINTAINED UNLESS OTHERWISE INDICATED. DIMENSIONS ARE TO BE MAINTAINED UNLESS OTHERWISE INDICATED.

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**PRELIMINARY  
NOT FOR  
CONSTRUCTION**  
DATE: 8/14/03

|                                                                                                  |  |      |  |                       |  |          |  |             |  |
|--------------------------------------------------------------------------------------------------|--|------|--|-----------------------|--|----------|--|-------------|--|
| NO.                                                                                              |  | DATE |  | ISSUED FOR EPA REVIEW |  | REVISION |  | INT.        |  |
| NOT TO SCALE                                                                                     |  |      |  |                       |  |          |  |             |  |
|                                                                                                  |  |      |  |                       |  |          |  |             |  |
| <b>SULLIVAN'S LEDGE SUPERFUND SITE<br/>NEW BED FORD, MASSACHUSETTS<br/>GAS EXTRACTION SYSTEM</b> |  |      |  |                       |  |          |  |             |  |
| ELECTRICAL                                                                                       |  |      |  |                       |  |          |  |             |  |
| <b>WIRING DIAGRAMS</b>                                                                           |  |      |  |                       |  |          |  |             |  |
| BY: CHANG, R.                                                                                    |  |      |  | FILE NO.              |  |          |  | E-2         |  |
| DESIGNED BY: CHANG, R.                                                                           |  |      |  | DATE                  |  |          |  | AUGUST 2003 |  |
| CHECKED BY: CHANG, R.                                                                            |  |      |  | DATE                  |  |          |  | AUGUST 2003 |  |



1. PLAN LAYOUTS WERE PREPARED BASED UPON INFORMATION OBTAINED FROM A SURVEY PREPARED BY DAVISON SURVEYING AND ENGINEERING CO. LIMITED "SIT PLAN IN NEW BEDFORD, MA, SULLIVAN'S LEADS SUPERFUND SITE", DATED AUGUST 28, 1993 LAST REVISED FEBRUARY 12, 1996.
2. LARGE EMBANKMENT AND ELEVATIONS IN ALL SHORINGWAYS AND UTILITIES ARE TO BE CONSIDERED APPROXIMATE ONLY AND SHALL BE VERIFIED AS REQUIRED IN THE FIELD BY THE CONTRACTOR.
3. OTHER INFORMATION SOURCES MAY PROVIDE THE LOCATION, DEPTHS AND EXTENT OF WATER UTILITIES. CONTRACTOR SHALL DETERMINE, AS IT PERTAINS TO THE AREA IN WHICH WORK IS TO BE CONDUCTED, THE LOCATION AND ELEVATION OF ALL UTILITIES IN THE FIELD AHEAD OF CONSTRUCTION.
4. ROADWAYS ARE TO REMAIN OPEN AT ALL TIMES.
5. CONTRACTOR SHALL MAINTAIN EXISTING DRAINAGE CHANNELS AT ALL TIMES. PROPER EROSION CONTROL TECHNIQUES (INCLUDING SILT FENCES AND STRAW BALE BARRIERS) SHALL BE IMPLEMENTED AS REQUIRED.

## SURVEY NOTES

1. TOPOGRAPHIC INFORMATION OBTAINED FROM A SURVEY PREPARED BY DANSON SURVEYING AND ENGINEERING CO. ENTITLED "SITE PLAN IN NEW BEDFORD, MA., SULLIVAN'S LEDGE SUPERFUND SITE", DATED AUGUST 29, 1992 LAST REVISED FEBRUARY 12, 1996.
2. ELEVATIONS AND COORDINATES ARE BASED ON BENCHMARK = MASS HIGHWAY BOUND #704A ELEVATION = 129.365 (NGVD).

[illegible]

1. THE CONTRACTOR SHALL CONTACT THE MASSACHUSETTS DIG-SAFE CENTER AND PROPER LOCAL AGENCIES TO CONFIRM LOCATIONS OF ALL EXISTING UTILITIES PRIOR TO INITIATION OF CONSTRUCTION ACTIVITIES AND ADVISE MINIMUM 14 DAYS BEFORE INITIATION OF CONSTRUCTION ACTIVITIES. TELEPHONE NUMBER: 1-800-345-5049.
2. THE CONTRACTOR SHALL PROVIDE THE ENGINEER WITH PROOF OF THE NOTIFICATION PRIOR TO THE INITIATION OF CONSTRUCTION ACTIVITIES.
3. THE CONTRACTOR IS RESPONSIBLE FOR THE PROTECTION OF ALL PUBLIC AND PRIVATE UNDERGROUND AND SURFACE UTILITIES.

**1. FACTS OF THE CASE**  
**2. ANALYSIS OF THE CASE**  
**3. CONCLUSION**

- GV-7  
+ PASSIVE GAS VENT
- GV-10  
+ GAS MONITORING WELL
- GV-5  
+ GAS WELL TO BE MONITORED INTO A GAS EXHAUSTION WELL
- b --- PROPERTY BOUNDARY
- ===== LIMITS OF CAP

THIS DRAWING WAS PREPARED AT THE SCALE INDICATED IN THE TITLE BLOCK. REPRODUCTIONS OF THE STATED SCALE MAY BE DISTORTED WHEN DRAWINGS ARE REPRODUCED BY ANY MEANS, USE THE GRAPHIC SCALE PROVIDED IN THE TITLE BLOCK TO DETERMINE THE ACTUAL SIZE OF THE DRAWING.

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ANY PERSON, UNLESS ACTING UNDER  
THE DIRECTION OF A LICENSED ENG-  
INEER, TO DESIGN AND CONSTRUCT

**PRELIMINARY**  
**NOT FOR**  
**CONSTRUCTION**  
DATE: 8/14/03

|     |      |          |  |                       |  |
|-----|------|----------|--|-----------------------|--|
| A   |      | 8/14/03  |  | ISSUED FOR EPA REVIEW |  |
| NO. | DATE | REVISION |  | INT.                  |  |

1" = 80'

**GIFFORD & GERE**  
ENGINEERS, INC.

**SULLIVAN'S LEDGE SUPERFUND SITE**  
**NEW BEDFORD, MASSACHUSETTS**  
**GAS EXTRACTION SYSTEM**

GENERAL

**EXISTING SITE PLAN**

|                    |  |                |
|--------------------|--|----------------|
| IN CHARGE OF _____ |  | TSF NO.        |
| DESIGNED BY _____  |  | 5509.28602.107 |
| CHECKED BY _____   |  | DATE           |
| DRAWN BY _____     |  | AUGUST 2003    |

**G-1**

G-1



1. EXISTING PIPING WAS WITH 10V-1 10V-4 AND G-13 SHOWN HERE AND IS TO BE MOVED INTO GAS EXTRACTION WELLS. SEE "GAS VENT MODIFICATION DETAIL" SHEET G-4.
2. REFER TO DRAWING G-4 "GAS EXTRACTION SYSTEM PLAN, SECTION & NOTES" AND SHEET G-4 "MISCELLANEOUS DETAILS" FOR SPECIFIC PIPING DETAILS AND NOTES.

LEAD

- ```

CV-1          PASSIVE GAS VENT
04-12
:
:          GAS MONITORING REL:
CV-3
=====
          GAS VENT TO BE INSTALLED INTO A
          GAS EXTRACTION WELL
*****
          PROPOSED PVC GAS EXTRACTION
          PIPE HEADER SYSTEM
-----
          PROPERTY BOUNDARY
-----
          LIMITS OF CAP
-----
          1/2" & GREATER DIA. AIR
          COPPER TUBING
-----
          3/4" & HEavier PRIMARY
          CONDENSATE PIPE 4" DIA. &
          GREATER MONITORING POINT

```

THIS DRAWING WAS PREPARED AT  
THE SCALE INDICATED IN THE TITLE  
BLOCK. REPRODUCED IN THE STATES  
SCALE MAY BE DIFFERENT FROM  
DRAWINGS ARE REPRODUCED BY ANY  
MEANS USE THE GRAPHIC SCALE BAR  
IN THE TITLE BLOCK TO DETERMINE

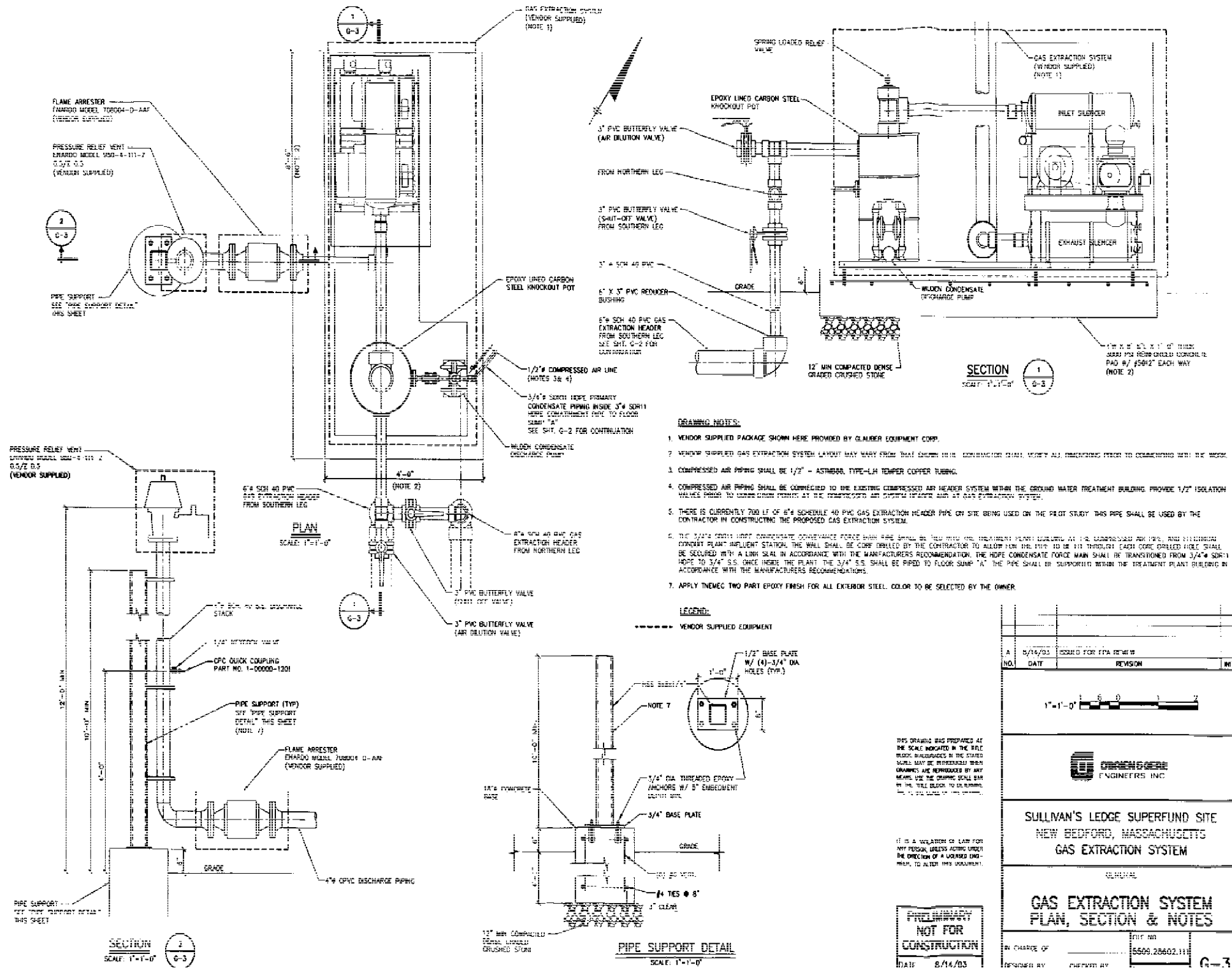
IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS ACTING UNDER THE DIRECTION OF A LICENSED ENGINEER, TO ALTER THIS INSTRUMENT.


**PRELIMINARY  
NOT FOR  
CONSTRUCTION**

DATE: 8/14/03

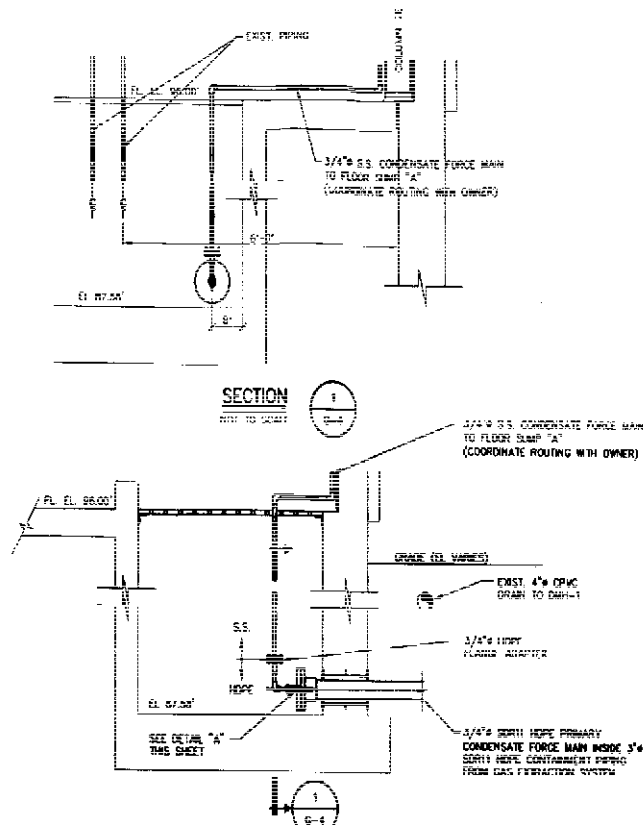
A	5/14/03	ISSUED FOR EPA REVIEW			
NO	DATE	REVISION			INT
<p>1" = 60'</p>					
<p>SULLIVAN'S LEDGE SUPERFUND SITE          NEW BEDFORD, MASSACHUSETTS          GAS EXTRACTION SYSTEM</p>					
<p>GENERAL</p> <p><b>GAS EXTRACTION          SYSTEM SITE PLAN</b></p>					
IN CHARGE OF _____ DESIGNED BY _____ CHECKED BY _____ DRAWN BY _____				NO. 0000 28602-106 DATE _____ AUGUST 2003	
				G-2	

G-2

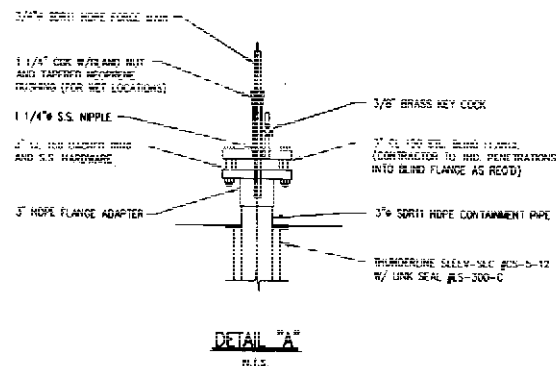


A		8/14/03	ISSUED FOR EPA REVIEW	
NO.	DATE	REVISION	BY	
1"=1'-0"				
				
SULLIVAN'S LEDGE SUPERFUND SITE NEW BEDFORD, MASSACHUSETTS GAS EXTRACTION SYSTEM				
GENERAL				
GAS EXTRACTION SYSTEM PLAN, SECTION & NOTES				
IN CHARGE OF		DATE		BY
DESIGNED BY		CHECKED BY		DATE
DRAWN BY		DATE		BY
		AUGUST 2003		

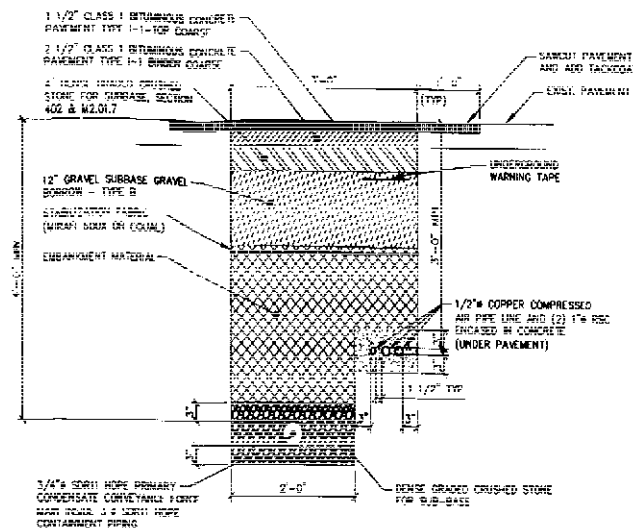
G-3



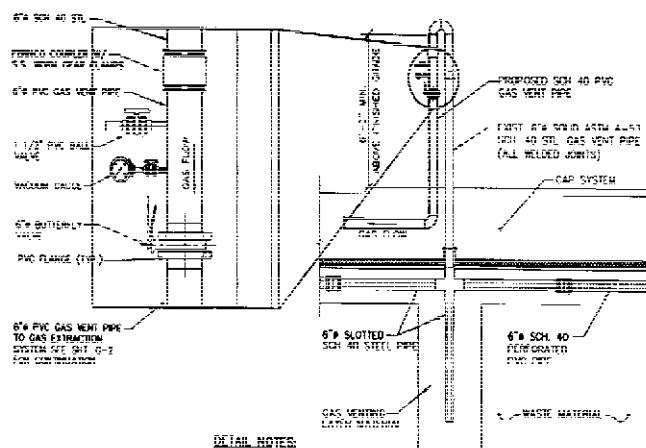
**GAS EXTRACTION FORCE MAIN PENETRATION DETAIL**  
NOT TO SCALE



**DETAIL "A"**  
N.T.S.

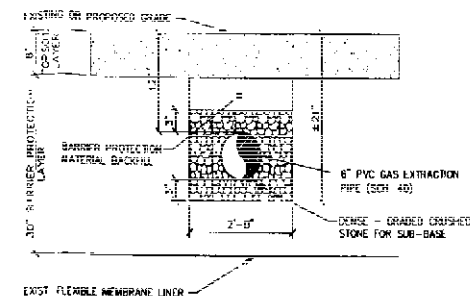


**GAS EXTRACTION FORCE MAIN/COMPRESSED AIR PIPING/ELECTRICAL SERVICE TRENCH DETAIL**  
NOT TO SCALE



- DETAIL NOTES:**
1. ALL GAS VENTS NOT CONNECTED INTO GAS EXTRACTION FORCE MAIN SHALL BE SEALED OFF WITH A PERMO-CAP.
  2. SEE "GAS EXTRACTION FORCE MAIN TRENCH DETAIL" THIS SHEET.

**GAS VENT MODIFICATION DETAIL**  
NOT TO SCALE



- DETAIL NOTES:**
1. THE 6" PVC GAS EXTRACTION PIPE SHALL BE BURIED 12" BELOW EXISTING GRADE TO THE TOP OF THE PIPE.

**GAS EXTRACTION FORCE MAIN TRENCH DETAIL**  
NOT TO SCALE

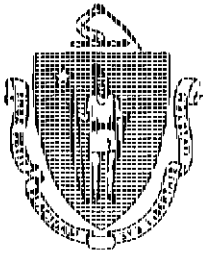
THIS DRAWING WAS PREPARED AT THE SCALE INDICATED IN THE TITLE BLOCK. REPRODUCES IN THE STATED SCALE MAY BE REPRODUCED WHEN DRAWINGS ARE REPRODUCED BY ANY MEANS, USE THE GRAPHIC SCALE BAR IN THE TITLE BLOCK TO DETERMINE THE ACTUAL SCALE OF THIS DRAWING.

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**PRELIMINARY  
NOT FOR  
CONSTRUCTION**  
DATE: 8/14/03

A		8/14/03		SUBMIT FOR EPA REVIEW		REVISED		DATE	
NO.		DATE		REVISION		DATE		BY	
<b>NOT TO SCALE</b>									
<b>SULLIVAN'S LEDGE ENGINEERS, INC.</b>									
<b>SULLIVAN'S LEDGE SUPERFUND SITE NEW BEDFORD, MASSACHUSETTS GAS EXTRACTION SYSTEM</b>									
GENERAL									
<b>MISCELLANEOUS DETAILS</b>									
IN CHARGE OF				FILE NO.				5500.28002.100	
DESIGNED BY				CHECKED BY				DATE	
DRAWN BY				AUGUST 2003					

## APPENDIX C



COMMONWEALTH OF MASSACHUSETTS  
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
ONE WINTER STREET, BOSTON, MA 02108 617-292-6500

ARGEO PAUL CELLUCCI  
Governor

JANE SWIFT  
Lieutenant Governor

BOB DURAND  
Secretary

LAUREN A. LISS  
Commissioner

September 23, 2003

Ms. Susan Studlien, Acting Director  
Office of Site Remediation and Restoration  
US EPA, (HIO)  
1 Congress Street, Suite 1100  
Boston, MA 02114-2025

Dear Ms. Studlien,

The Department of Environmental Protection ("the Department") has reviewed the proposed Explanation of Significant Differences (ESD) for the Sullivan's Ledge Superfund Site, Operable Unit 1 (OU-1), in New Bedford, submitted by EPA on September 22, 2003. The Department concurs with this ESD at OU-1 as described below.

There was no provision in the original Record of Decision for the collection of gas migrating from the Disposal Area of the Site. The existing Disposal Area cap, constructed in accordance with the ROD, did not include a sand layer to collect methane emissions. The collection of landfill gas is needed based on the results of the Comprehensive Site Assessment conducted by PRPs in July 2002 and the Corrective Action Analysis. The Sullivan's Ledge Group (the group of 14 private parties) will install a permanent onsite soil gas extraction and collection system.

The operation of landfill gas extraction and collection system is necessary to ensure that the remedy is protective of human health and the environment, and will include stack monitoring in accordance with an amendment to the Post Construction Environmental Monitoring Plan to meet Applicable, or Relevant and Appropriate Requirements.

The Department looks forward to the implementation of the remedy at the Site. If you have any questions relative to this letter, please contact Evelina Vaughan, DEP Project Manager, at (617) 348-4037 or [evelina.vaughan@state.ma.us](mailto:evelina.vaughan@state.ma.us)

Sincerely,

Deirdre Menoyo, Assistant Commissioner  
Bureau of Waste Site Cleanup

Cc: David Laderer, EPA  
Jay Naparstek, DEP  
Paul Craftley, DEP  
David Buckley, DEP

e-file: c/Sullivan's Ledge/7.C1/Concur.ESD/DEP 091703

This information is available in alternate format by calling our ADA Coordinator at (617) 574-6872.

DEP on the World Wide Web: <http://www.state.ma.us/dep>



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